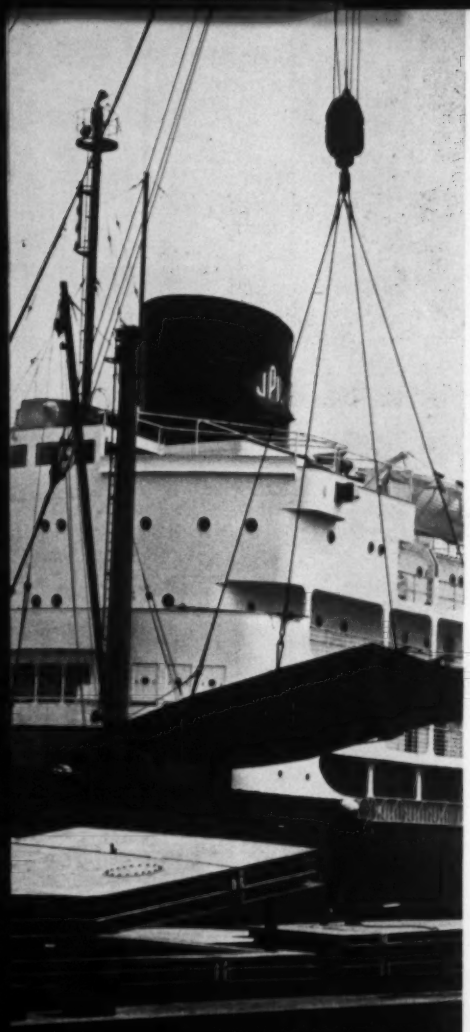
FEBRUARY 8, 1960

STEEL
The Metalworking Weekly

A PENTON PUBLICATION



Profit Prospects Take on New Glow

Metal Finishing: Material Suppliers Ponder Complete Package Deals

Ultrasonics Chalk Up Gains In Welding Dissimilar Metals

X-ray Takes on More Production Jobs

PRODUCTION EFFICIENCY

No. 3 in STEEL's 1960 Program for Management

How to Diagnose Your Equipment Needs

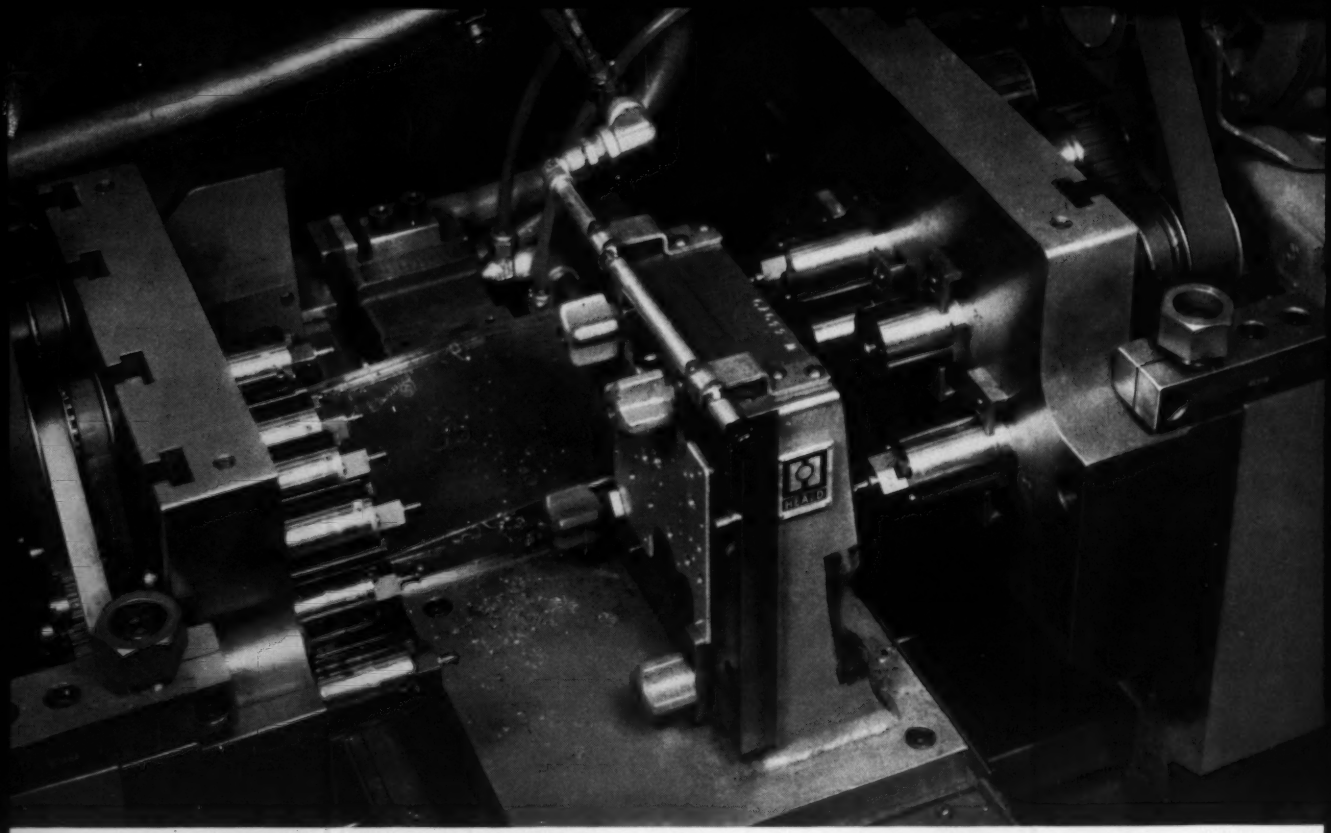
Page 53

Steel Exports Swing Up

Steel imports topped exports by over 2.3 million tons last year. The steel strike can be blamed for part of the lost overseas business. But a major factor is the expansion of foreign steelmaking capacity—it's growing faster than ours. Domestic steelmakers will regain some export sales this year, but overseas competition is stiffening. See Page 109.

COMPLETE CONTENTS
TURN PAGE

METALWORKING OUTLOOK
PAGE 33



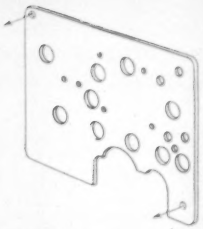
Bore 23 holes on 1 machine

Heald Model O Bore-Matic solves multiple-hole Borizing problem with interchangeable Multi-Spindle Heads

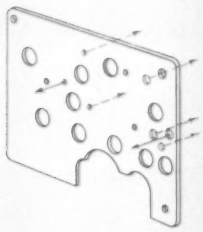
The Problem—to precision bore 23 holes, ranging from .0365″ to .3570″ in diameter, in medium-hard aluminum gear-box plates, with a tolerance of .0005″ on diameter and .0009″ on centers—also to bore 12 similar holes in a matching plate.

The Solution—a Heald double-end Model O Bore-Matic equipped with two sets of interchangeable Multi-Spindle boringheads. As shown in the drawings at the right, the 23-hole plate is precision Borized to the required tolerances in only three operations, using an indexing cross-slide and with all holes accurately positioned by cross-slide index and spindle location. One set of Multi-Spindle heads is used for the first two operations—then spindle plates are changed for the final operation. The second set of spindle plates also finishes all bores in the 12-hole plate in two operations. Average production is 10 parts per hour.

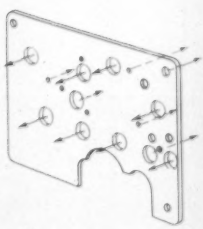
Heald Multi-Spindle boringheads consist of interchangeable spindle plates, precision bored to mount the desired number of miniature Red-Head boringheads which are belt-driven from a single motor. This arrangement permits simultaneous Borizing of multiple holes with center distances as close as ¾″. To save production time and cost on your multiple-hole borizing jobs, ask your Heald engineer for complete information on Model O Bore-Matics.



1. Bore two locating holes in single-end cycle using spindle plate No. 1.



2. Bore 7 holes in double-end cycle using spindle plates No. 1 and 2.



3. Replace spindle plates No. 1 and 2 with No. 3 and 4 and bore 14 holes in double-end cycle.

(Arrows show direction of table travel for holes indicated)

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This Week in STEEL the Metalworking Weekly

February 8, 1960 Vol. 146 No. 6

Metalworking Outlook, Page 33

The Editor's Views—Be a Yankee Trader! 39
▸ Profit Prospects Take on New Glow—Annual earnings study 43
1960 Shapes Up as Another Troubled Year in Labor 45
New Hot Strip Mill Gets Computer Control—It's transitorized 46
▸ Metal Finishing: Material Suppliers Ponder Package Deals .. 47
Construction Boom to Bolster Lath Upturn—Use of metal up 48
New York Firm Sells World Markets 49
▸ How to Diagnose Your Equipment Needs—Watch for entropy 53
No. 3 in STEEL's Program for Management for 1960
Bethlehem's Capital Outlay to Jump to $172 Million 72

Technical Outlook, Page 77

▸ Ultrasonic Welding Can Improve Joints in Dissimilar Metals 78
Diamond Abrasive Eases Metallographer's Task 80
Atmosphere Furnace Automates Stainless Tube Annealing 82
Thermoelectric Cooling Hits Commercial Stride 83
Wrap Method Strengthens Rocket Chambers—Ryan development 84
Progress in Steelmaking—Swing and Sound Clean Exhaust Gas Filters—Method permits use of glass bags 86
Success of Corrosion Test Widens Field for Titanium 88
Machine Topics—Tape Control Will Capture Lion's Share of Drill Jobs—Prediction made by Cincinnati builder 90
▸ X-ray Gains in Process Control—In-line applications grow ... 92
Extrusion Press Makes Tube Bigger, More Concentric 93

Market Outlook, Page 107

Complete Index to Market News and Prices 107
▸ Steel Exports Swing Up—But overseas competition is stiffer ... 109
Steelworks Operation Chart and District Ingot Rates 114
Finished Steel Shipments by Market Classifications 114
Scrap Price Slips in Dull Market—Composite down 33 cents .. 127
Nonferrous Metals—Copper Strike Is About Over 130
Consumers' Scrap Stocks Increased During Strike 133

▸ Articles listed on cover.

WHERE TO FIND

	Turn page		
Metalworking Pulse		The Business Trend	63
STEEL Servicenter	5	Men of Industry	67
Calendar of Meetings	10	Obituaries	71
Editorial & Business Staffs	16	New Products	95
Windows of Washington .	50	New Literature	104
Mirrors of Motordom	59	Advertising Index	135

Index available semiannually.

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STEEL, the metalworking weekly, is selectively distributed without charge to qualified management personnel with administrative, production, engineering, or purchasing functions in U. S. metalworking plants employing 20 or more. Those unable to qualify, or those wishing home delivered copies, may purchase copies at these rates: U. S. and possessions and Canada, $10 a year; all other countries, $20 a year; single copies, 50 cents. Metalworking Yearbook issue, $2. Published every Monday and copyright 1960 by The Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio. Accepted as controlled circulation publication at Cleveland, Ohio.

Metalworking Pulse ▸

TURN

Metalworking Pulse

INDUSTRIAL PRODUCTION INDEX

	WEEK ENDED JAN. 30	PREVIOUS WEEK	MONTH AGO	YEAR AGO
(1947-49=100) Based on steel output, electric power output, freight carloadings, auto assemblies	184†	185	168	159

†Preliminary.

Even though the revised reading for the week ended Jan. 23 set a record, STEEL's industrial production index is showing definite signs of leveling off. The boom is not yet spent, but it is being contained.

Details on Page 63

U. S. PASSENGER CAR PRODUCTION

	WEEK ENDED FEB. 6	PREVIOUS WEEK	MONTH AGO	YEAR AGO
Number of units assembled	173,000*	174,017†	163,249	114,282
(Source: Ward's Automotive Reports.)	*Estimated.	†Preliminary.		

Auto producers are beginning to cut back production. There have been no major slashes yet, but unless dealers' reports for late January improve significantly, output will drop this month.

Details on Page 60

NATIONAL STEEL INGOT PRODUCTION

	WEEK ENDED FEB. 7	PREVIOUS WEEK	MONTH AGO	YEAR AGO
Net tons (thousands)	2,693*	2,717	2,715	2,288
Index (1947-49=100)	167.6*	169.1	169.0	142.4
Percentage of capacity	94.5*	95.4	95.3	80.8

*Estimated by STEEL; comparative figures reported by AISI.

Output of ingots and steel for castings dropped below the 2.7 million ton mark for only the second time in the last two months. Part of the drop is attributed to disruption of schedules caused by cancellations of duplicate orders.

Details on Page 114

STEEL SCRAP PRICE COMPOSITE

	FEB. 3	WEEK AGO	MONTH AGO	YEAR AGO
Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.	$42.00	$42.33	$41.33	$42.50

Price trend on No. 1 heavy melting steel turned downward last week for the first time since mid-December. Easiness is due to continued lack of large orders from mills and a rise in generation.

Details on Page 127

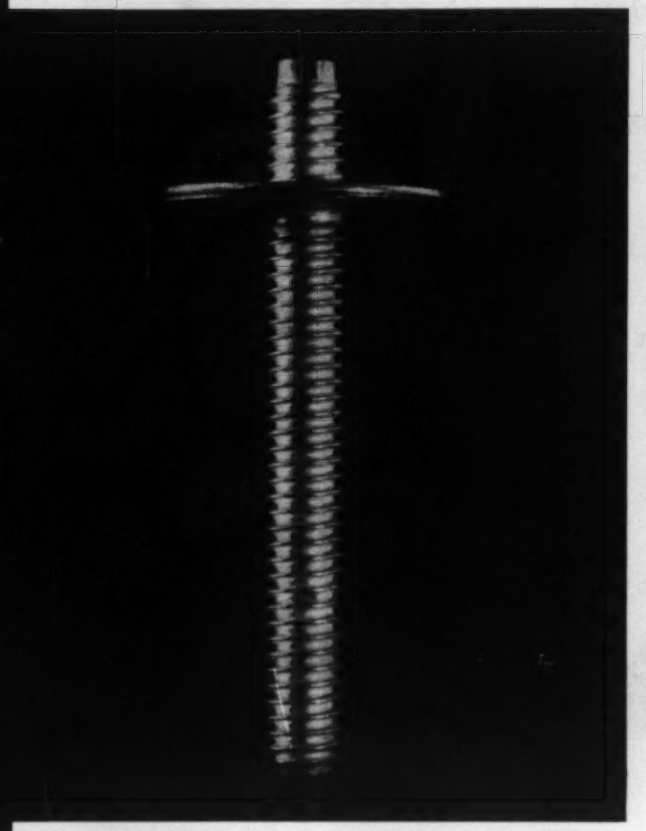
FINISHED STEEL PRICE INDEX

	FEB. 2	WEEK AGO	MONTH AGO	YEAR AGO
Based on Bureau of Labor Statistics data (1947-49=100)	186.8	186.8	186.8	187.0

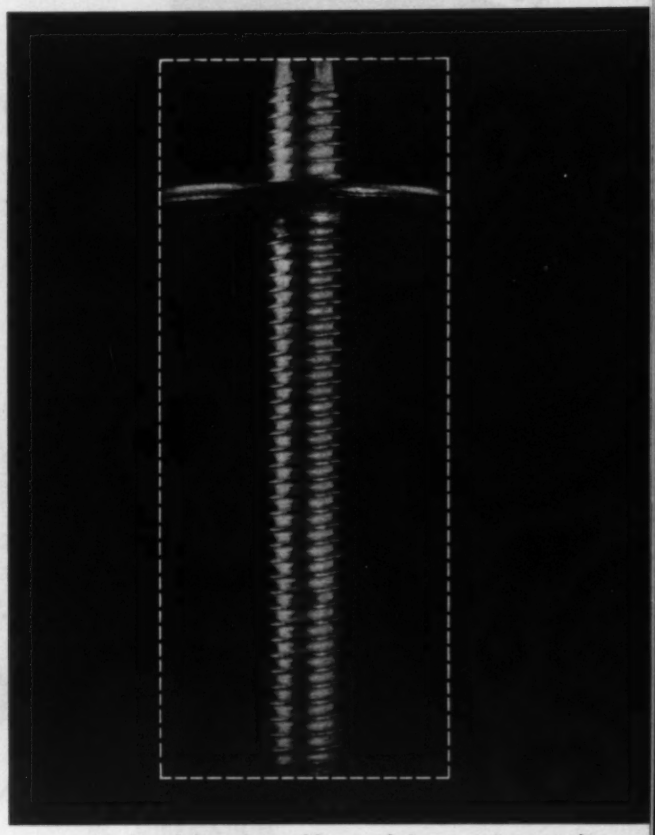
Executives of major steel firms are withholding comments on the probable price levels of 1960 pending determination of the impact of the wage settlement on costs of steel labor and purchased materials and services.

Details on Page 115

This "impossible" screw is now being cold-headed



Now cold-headed from steel wire at one-tenth the cost.



Machined from bars, 91 pct of the steel is wasted.

This automobile window-adjusting channel screw is being produced from cold-heading wire at one-tenth the original cost. Formerly machined from bar stock with a 91 per cent waste, this special screw is upset to three-and-one-half times the diameter of its shaft.

Bethlehem Steel has played a vital role in the progress of cold-heading by supplying steel wire in the proper grades and analyses, and by recommending the correct heat-treatment.

You may now be machining parts that can be cold-headed, at less cost—and with improved properties. By no means do we say that we can supply cold-heading wire for every one of them. But our experienced metallurgists have helped many users of cold-heading wire to improve their results. Perhaps they can do the same for you. Our nearest sales office will welcome the chance to talk it over. Or get in touch with us at Bethlehem, Pa.

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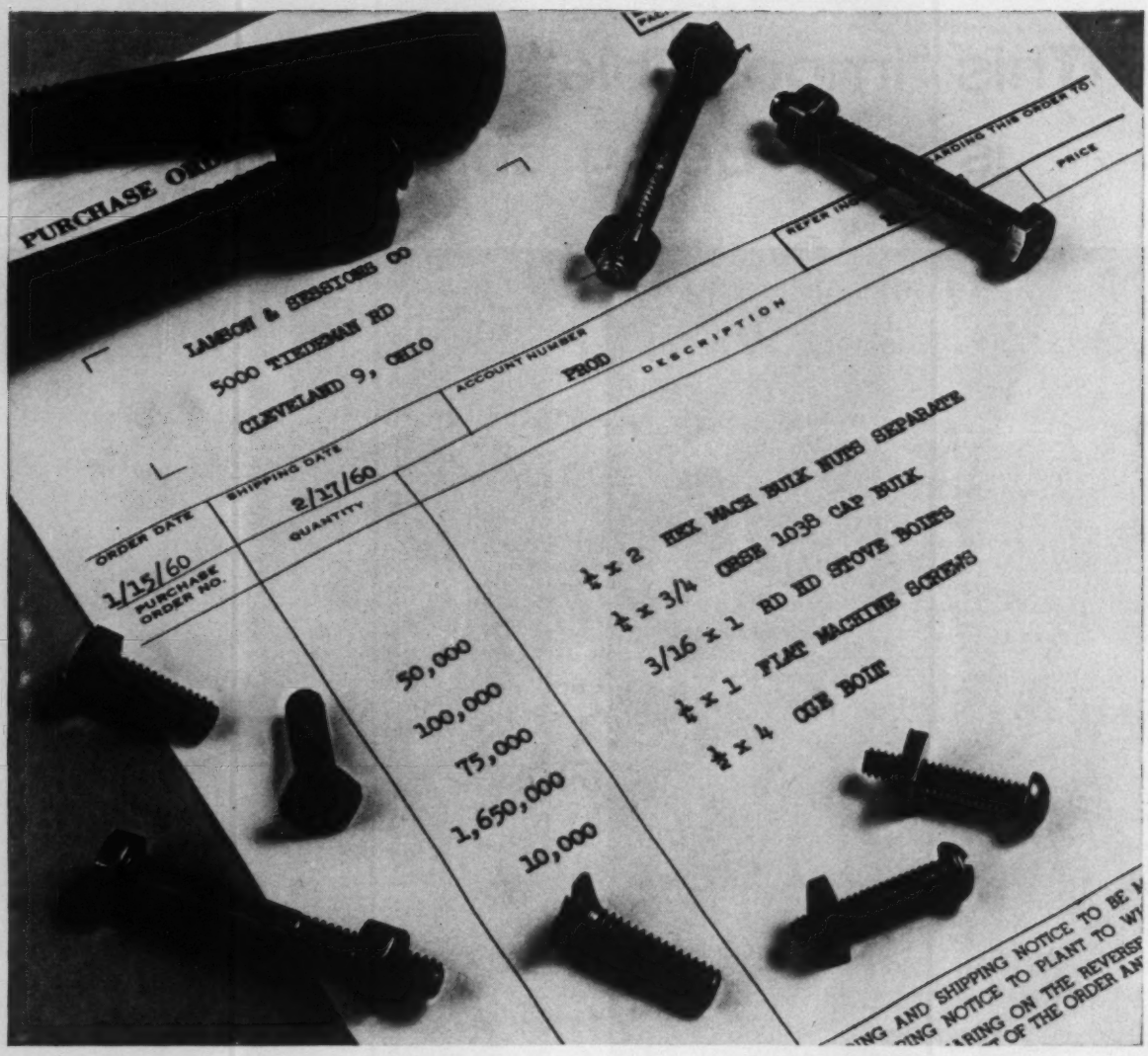

Where to get fasteners when things get rough

In recent months we have been swamped with orders from companies whose "dependable source of supply" had suddenly vanished.

We value these new customers, naturally. Maybe you are one of them. Nevertheless, it's Lamson policy to take care of old customers first. It's an important way of putting meaning into the word "service".

If you buy fasteners in quantity, give serious consideration to making Lamson & Sessions your prime fastener source. Then you will have the best protection available when things get rough.

Why L & S customers are confident customers:

- Production and back-up stocks at *four* fine plants – located to serve you from Chicago, Cleveland, Kent, Ohio and Birmingham, Alabama.
- Complete fastener line – to give you one-order, one-shipment, one-invoice economy.
- Sales engineers in all major areas – factory engineering assistance for your special requirements.
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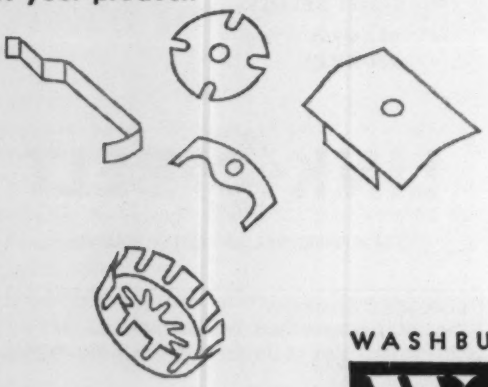

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TEMPERED AND UNTEMPERED FLAT AND ROUND HIGH CARBON WIRES

Value in a Modern Colossus

One of the seven wonders of the ancient world, the Colossus of Rhodes near Asia Minor, played a part in the scrap industry's 5000 year history. After the huge bronze statue of Apollo was toppled by an earthquake in 224 BC, bands of marauding natives chopped it up and sold the pieces for remelting into scimitars.

American industry may be overlooking a modern colossus, and the salvage doesn't involve desecration of a relic.

Only 80 per cent of the metal going into your plant will come out as finished products. Unless you're able to defy the average, it means the other 20 per cent is wasted. Next week, Associate Managing Editor Vance Bell will give you 12 helpful hints on starting a do-it-yourself program to improve scrap quality. As well as adding to your revenue, a good disposal program can clear the decks for more efficient production, cut down waste space, and reduce accident hazards. Watch for the article.

If You Don't Like Money . . .

. . . and you're a trophy collector, you'll be interested in the awards we're getting up for our Usership Idea of the Month Contest. Our Art Department has designed some handsome wall plaques for the winners and those receiving honorable mentions will get suitably engraved desk lighters. Each plaque will be made of satin finished stainless steel mounted on solid mahogany. On each will appear: "STEEL Usership Idea of the Month Award," with the name of the winner and the date of the award. The name STEEL will appear in color just as it does on our front cover. For contest information, see Page 6.

We Gain a Reader

A few months back, we let you in on some correspondence with a faithful STEEL reader, Charlsie Vunovic, a secretary in the works manager's office at General Steel Castings Corp., Granite City, Ill. We said we would undoubtedly be hearing from Charlsie again, and that "until National Secretaries Week rolls around, we hold that Charlsie is one of the greatest secretaries going."

On Jan. 18, we presented Ed Case's version of an editor's traits and duties. In it, we blithely said that an editor must attend births, among other things. What could be safer?

Last week, Charlsie wrote to us, saying: "In view of those facts concerning editors, I just couldn't resist writing to you . . . Which editor will be in Granite City to chain smoke cigarettes with my husband (Walt Vunovic) while I'm busy bringing our daughter a little brother or sister?"

When? Why, during National Secretaries Week, of course.

How Much Is Up?

The *San Francisco News-Call Bulletin* ran this letter to the editor Jan. 14:

"In an editorial dealing with the steel strike settlement, you cited STEEL Magazine as estimating that the cost of the settlement would be $16 per ton . . . It takes only elementary arithmetic to see that an increase of 39 cents an hour would be $15.60 for a 40 hour week. Am I to infer, then, that it takes the labor of almost an average employee in the industry to produce one ton of steel per week? If not, how did the magazine arrive at its estimate. /s/ T. David Zuckerman."

The *News-Call Bulletin's* editor's reply: "We don't know how to figure the cost of a ton of steel. That's why we had to quote STEEL Magazine."

A full explanation of the formula was on Page 33 of our Jan. 25 issue. We sent copies to both parties.

The Pressure of Work

General Electric Co.'s disclosure of how diamonds are made with pressures from 800,000 to 1.8 million psi and temperatures from 2200 to 4400° F brought to mind some writings from the year 1879. At that time, J. B. Hanney of Glasgow, Scotland, experimented with making diamonds by maintaining sealed iron cylinders at red heat for 14 hours. He wrote: "The continued strain on the nerves (while) watching the temperature of the furnace, and (being) in a state of tension in case of explosion, induces a nervous state, which is extremely weakening, and when the explosion occurs, it sometimes shakes

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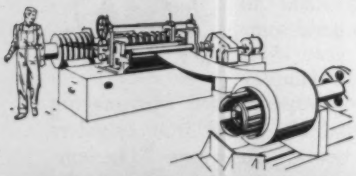

ENGINEERING YODER MANUFACTURING ROTARY SLITTING LINES

one so severely that sickness intervenes."

Shortly after GE revealed its process, the DeBeers South African diamond syndicate announced it also had perfected a synthetic diamond process.

With the field becoming so crowded, maybe the work is less harrowing than it was in 1879.

HERE'S HOW YOU CAN WIN

$1000 This Month

in STEEL'S

Usership Idea of the Month Contest

Tell us, in 300 words or less, how you plan to USE an article or advertisement in this issue (or any other issue published this month—February, 1960) to help you accomplish an important personal or company objective.

Be as specific as you can. If, in the opinion of the judges, yours is the best idea submitted—

YOU WILL WIN $500

There's more . . . you will win an additional $500 if you submit written proof that you were successful in accomplishing your objective. Proof must be submitted within six months after you are declared winner of STEEL's Usership Idea of the Month Award.

Entries will be judged by a committee of STEEL editors. All letters become the property of STEEL Magazine.

This Month's Deadline
Apr. 1, 1960

Send your entries to:
Ed Service, Servicenter
STEEL
1213 W. Third St., Cleveland 13, Ohio

We're Glad to Fill . . .

. . . this request from J. R. Ferguson, general supervisor, Plant Engineering, Ryan Aeronautical Co., San Diego, Calif.: "I would appreciate receiving your series of articles on Production Efficiency. I am sure they will assist us in our efforts toward continuous improvement of our equipment replacement policies."

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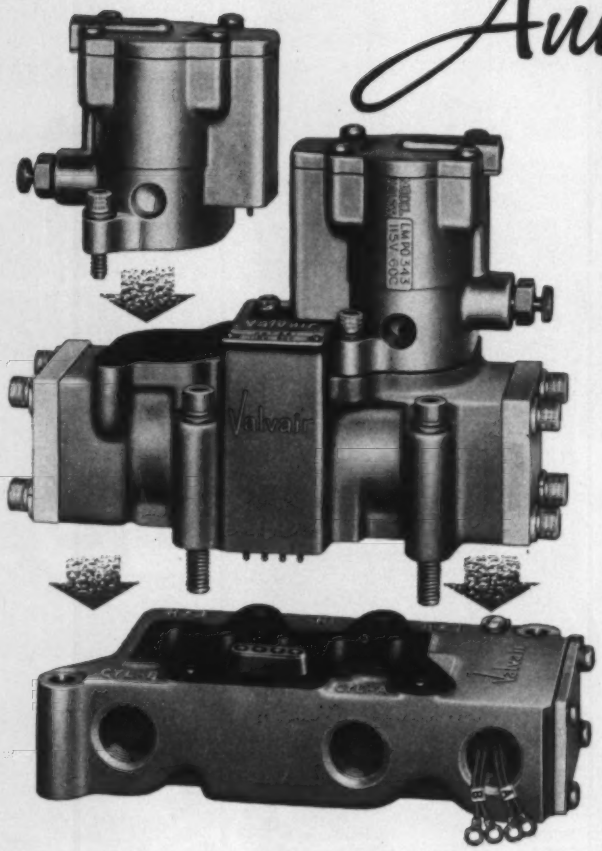

MODEL PD-441 shown. 4-way single or double pilot-operated types, for sub-base or manifold mounting. Aluminum and stainless steel components assure multi-million cycle dependability. Interchangeable pilots, with coils guaranteed against burn-out for life of valve, fit any plug-in Speed King. Coils for ac or dc, any voltage . . . 35 — 200 psi range . . . integral junction box . . . optional manual over-ride, common or separate exhaust ports, sub-base connected external pilot supply . . . ¾ in. exhaust ports, ½ or ¾ in. inlet and cylinder ports . . . valve meets JIC standards.

Based on the service-proved design principle of the Speed King ¼ in. plug-in Valvair's ½ - ¾ in. plug-in valve series provides plug-in convenience and versatility to a wider range of control valve applications.

Electrical and pneumatic circuits are completed automatically when valve and pilot are plugged in . . . bolted down. The result — cost-cutting reduction of original installation and maintenance time. All power connections are made permanently in sub-base or manifold . . . there's no need to disturb piping or wiring for quick in-service maintenance.

What's more, advanced design shortens stroke . . . speeds response. Separate coded (4-wire) circuits on double solenoid models meet JIC requirements. Flow area through valve and sub-base equals that of full ½ in. pipe.

Whether your control valve applications are on the drawing board or now in service, it'll pay you to investigate the advantages of Valvair plug-in design. A call to your near-by Valvair field office will bring prompt application engineering recommendations.

For more information, write for Bulletin SPL. Address Dept. ST-260 Valvair Corporation, 454 Morgan Ave., Akron 11, Ohio

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Biggest man-built island

SEVEN miles off the coast of Louisiana, reaching 220 feet below and rising 60 feet above the Gulf of Mexico, is a massive steel island. It's the world's first offshore sulphur mining plant.

This mine is a project of the Freeport Sulphur Company, and is scheduled to open in 1960. Known as the *Grand Isle*, it will be one of the world's largest sulphur mining operations. The Frasch process will be used. Every day, 5 million gallons of sea water, heated to 325°F., will be injected into the underground sulphur deposit. Hot water melts it. Compressed air will force the liquid sulphur to the surface.

The Gulf of Mexico brews black storms. Vicious storms. But this mile-long structure is built to take the brutal pun-

ishment of the sea. From end-to-end, it's braced with tons of heavy-wall pipe from National Tube.

National Tube is also supplying casing, line pipe and standard pipe for the completion of this project. For more than 80 years, National Tube has handled tough tubular installations in the fields of line pipe, marine piping, mechanical tubing and oil country tubular products. Write us for assistance. National Tube Division, United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

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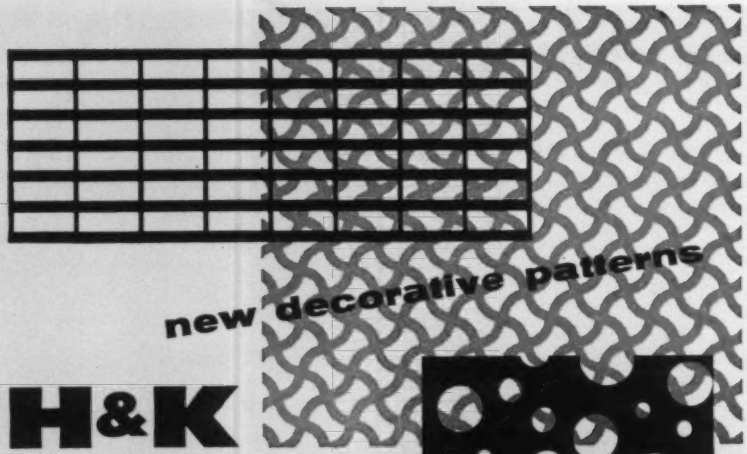

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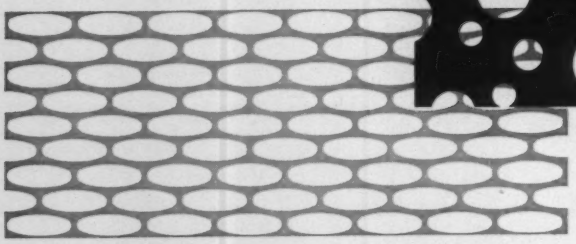
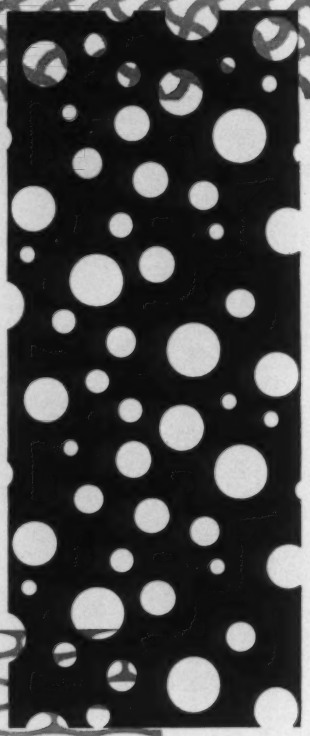
And there is also a vast selection of additional patterns and open areas which can be custom fabricated from existing dies. H & K can perforate practically any material. May we put our more than 75 years of experience to work for you?





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☐ STOCK LIST of Perforated Sheets

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CALENDAR
OF MEETINGS

Feb. 14-18, American Institute of Mining, Metallurgical & Petroleum Engineers Inc.: Annual meeting, Sheraton-Atlantic and Statler-Hilton Hotels, New York. Institute's address: 29 W. 39th St., New York 18, N. Y. Secretary: E. O. Kirkendall.

Feb. 15-17, American Management Association: Midwinter personnel conference, Palmer House, Chicago. Association's address: 1515 Broadway, New York 36, N. Y.

Feb. 16-18, Caster & Floor Truck Manufacturers Association: Annual meeting, St. Moritz Hotel, New York. Association's address: 27 E. Monroe St., Chicago 3, Ill. Executive secretary: Harry P. Dolan.

Feb. 17-18, Malleable Founders' Society: Technical and operating conference, Wade Park Manor, Cleveland. Society's address: 781 Union Commerce Bldg., Cleveland 14, Ohio. Executive vice president: Lowell D. Ryan.

Feb. 21-24, American Institute of Chemical Engineers: Winter meeting, Biltmore Hotel, Atlanta. Institute's address: 25 W. 45th St., New York 36, N. Y. Secretary: F. J. Van Antwerpen.

Feb. 22-25, Industrial Diamond Association: Annual meeting, Hollywood Beach Hotel, Hollywood Beach, Fla. Association's address: 587A Newark-Pompton Turnpike, Box 175, Pompton Plains, N. J. Executive manager: Mrs. Margaret J. McGinnis.

Feb. 24-26, American Management Association: Marketing conference, Roosevelt Hotel, New York. Association's address: 1515 Broadway, New York 36, N. Y.

Feb. 24-26, American Management Association: Research and development conference, Drake Hotel, Chicago. Association's address: 1515 Broadway, New York 36, N. Y.

Feb. 24-27, National Tool & Die Manufacturers Association: Winter meeting, Roosevelt Hotel, New Orleans. Association's address: 907 Public Square Bldg., Cleveland 13, Ohio. Executive vice president: George S. Eaton.

Feb. 29-Mar. 4, Pittsburgh Conference on Analytical Chemistry & Applied Spectroscopy: Penn-Sheraton Hotel, Pittsburgh, Pa. Information: W. J. Feingold, Semiconductor Dept., Westinghouse Electric Corp., Youngwood, Pa.

Mar. 6-9, American Society of Mechanical Engineers: Gas turbine power and hydraulic conference, Rice Hotel, Houston. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: O. B. Schier.

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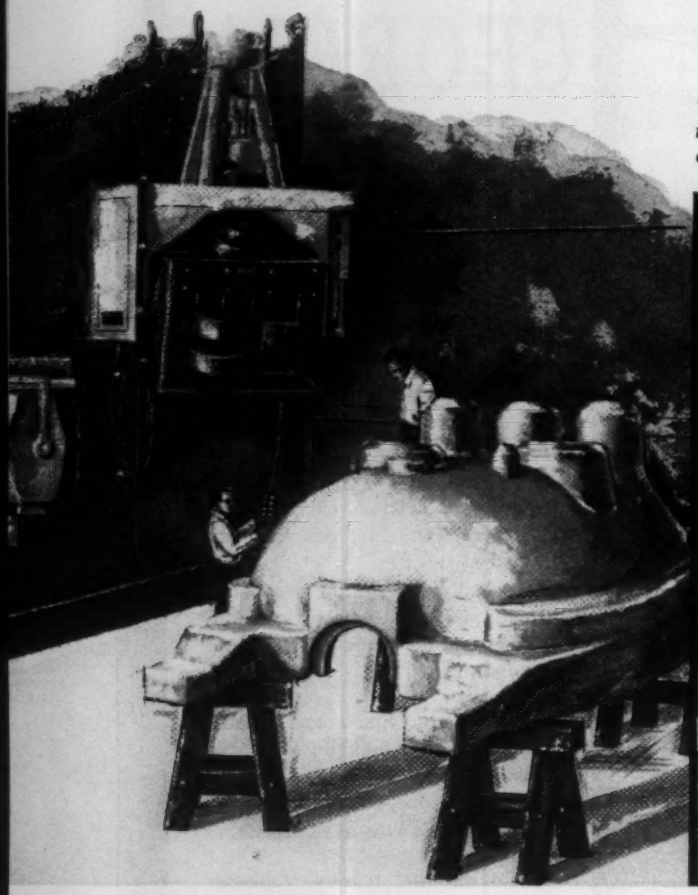
...where industrial progress is cast in steel

NON-DESTRUCTIVE TESTING ...the inside story



To insure the required quality throughout, the most modern non-destructive testing equipment is used at General Steel.

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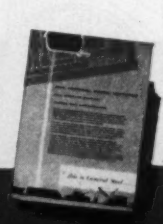

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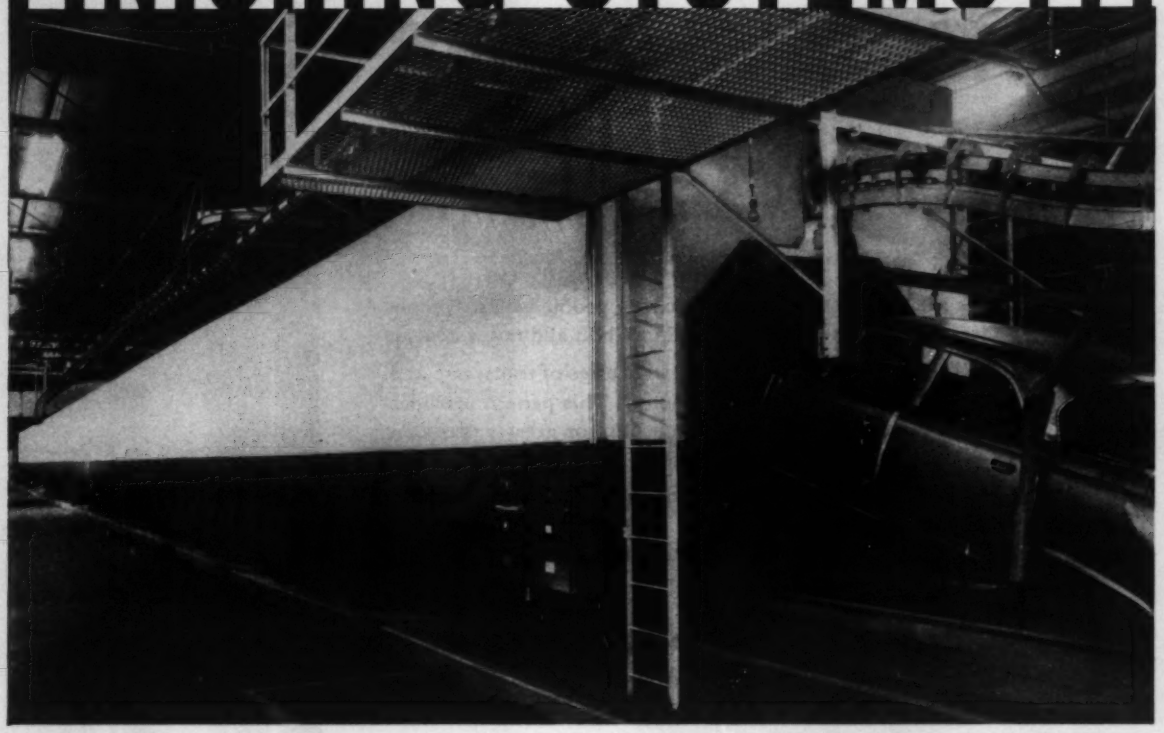

Mahon Six-Stage Combined Dip and Spray Cleaning, Rust Proofing and Surface Preparation Machine.

CHRYSLER of CANADA Installs New Antirust Facilities for BODY FINISHING—Including DIP PRIME COATING!

Primer Dip Tank—9000 Gallons of Water-Reducible, Rust-Inhibiting Primer. Bodies are Immersed to a Depth of 18" and are Soaked in this Rust-Proofing Primer for One Minute and Thirty Seconds.

In the new, conveyorized anticorrosion equipment recently installed by Mahon in the Windsor Plant of Chrysler Corporation of Canada, Limited, the bodies pass through seven operations of Cleaning, Rust Proofing and Dip Prime Coating.

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When you consider buying a new finishing system, or any unit of finishing or processing equipment, you, too, will want to discuss methods, equipment requirements and possible production layouts with Mahon engineers . . . you'll find them better qualified to advise you, and better qualified to do the initial planning and engineering which plays such an important role in the ultimate operating efficiency of specially designed equipment of this type.

See Sweet's Plant Engineering File for Information and Representative Installations, or Write for Catalogue A-660

THE R. C. MAHON COMPANY • Detroit 34, Michigan

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. . . the EXPERIENCE that goes into the PLANNING and ENGINEERING of MAHON EQUIPMENT is the item of GREATEST VALUE to YOU!

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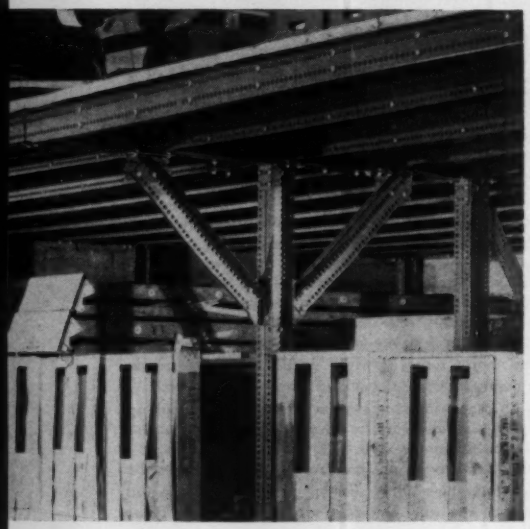
... Faster, Stronger, Safer Framing

Republic METAL LUMBER® solves framing problems fast. Simply measure, cut, assemble with ordinary bolt and nut fasteners.

Bolting pattern is a symmetrical series of transverse and longitudinal slots, punched on ¾" centers. This pattern provides bearing capacity in joints equal to or greater than that of the angles in the beam section.

METAL LUMBER is fabricated from cold rolled steel to assure uniform physical properties, and high strength-to-gage ratio. And Bonderized after fabrication for complete protection to all exposed surfaces.

Available in two gages, two widths, in standard bundles of either 10- or 12-foot lengths. Order from your Republic-Berger warehouse. Send coupon for more information.



Build any framing structure faster and easier. No skilled labor required. METAL LUMBER won't warp, can't crack, splinter, or rot; is reusable. Mezzanine structure permits maximum storage at Millhurst Mills, Freehold, New Jersey.

METAL LUMBER solves many warehouse storage problems. Here, split-level storage has METAL LUMBER bins engineered for every type of building product. Flooring is laid on top of metal framing on lower level. METAL LUMBER is used throughout the Millhurst Mills Warehouse.

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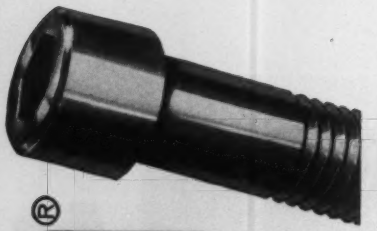

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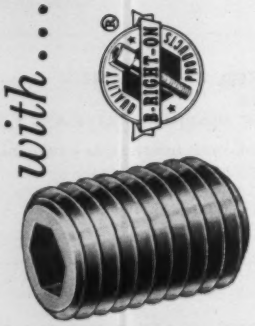

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The Youngstown Sheet and Tube Company Youngstown, Ohio

Youngstown

-growing force in steel

MEN

STEEL is a business of men. Strong men with big jobs to do. Over 31,000 men and women work Youngstown's mines, ships and furnaces. At historic Brier Hill or Struthers, the massive Campbell Works; at bustling Indiana Harbor or South Chicago or the Hubbard Works, they man 39 mills to make sheet, pipe, conduit, bars, tin plate, alloy and Yoloy steels. Youngstown men build, too. The world's first 52-inch, 6 stand tandem cold reducing mill for accurate-gauge tin plate and Youngstown's first continuous sheet steel galvanizing line are just two new projects which tell you Youngstown is a growing force in steel.

SHIPS

STEEL is a business of ships. Oreboats racing 820 miles from Duluth to Indiana Harbor and back again in 6 days. Oreboats running the 975 miles from Seven Islands to Ashtabula with more than 20,000 tons of ore in each steel-bound hull. Ships marked with the Orange Bands of Youngstown bringing ore and limestone and coal to vast, heaping storage docks the size of football fields. Ships of Youngstown's integrated operation complete the cycle from ore to coal to mills to quality steels. Ships feed in the raw materials that make Youngstown today, more than ever before, a dynamic, modern, growing force in steel.

Youngstown

HEARTHS

STEEL is a business of heat. A business of bubbling open hearths, roaring blast furnaces and seething coke ovens. Youngstown steel is born in 41 open hearth furnaces. Giant ladles pour out Youngstown's 6,750,000 ingot ton capacity. They feed the sheet, pipe and bar mills, the rod, wire and tin plate mills—all the Youngstown mills to make quality steels that can be cut, coupled, bent, formed, drawn, stamped, forged, welded or machined. In the past 10 years, Youngstown's capacity to produce steel has increased over 65%. This always expanding figure tells you Youngstown is now and will be a growing force in steel.

MINES

STEEL is a business of mines. It is a vast Mesabi ore pit. It is an underground shaft on the Gogebic. A taconite pellet from Minnesota. Ore from Labrador's Seven Islands. From the far-flung mines and quarries of Youngstown come basic ore and coal, limestone and dolomite. This planned abundance of the essentials of steel means a steady mill operation with on time delivery to the user. With present resources alone, Youngstown offers a dependable source of supply reaching into the 21st century. This ability to control its own destiny is another of the many reasons why Youngstown is a growing force in steel.

growing force in steel

© The Youngstown Sheet and Tube Company Youngstown, Ohio

STEEL SCOPE

STEEL is ten thousand products. It is a desk in the Pentagon. A car. A dishwasher. A lawn mower blade. It is a gas line in Florida. 8000 feet of drill pipe in a Maracaibo oil well. A can of beer in your cooler. Or a reinforcing bar. No matter who you are or where you are, you benefit from the magic things men do with this inexpensive metal. You can live with steel. Work with it in any of its forms—sheet, pipe, strip or bar. Youngstown's Orange Band steels are exactly the type and shape and size you want. To specification. The many kinds and uses of Youngstown steels help make Youngstown a growing force in steel.

YOUNGSTOWN STEEL spans the hemisphere. Through 28 Youngstown offices—and through independent steel service centers, through 750 pipe distributors, 355 electrical jobbers, through 155 stores and offices of Continental-Emsco, and Fibercast (2 divisions of Youngstown)—the Orange Band brand serves all industry with steel, with service and new steel ideas for cost-conscious businessmen. In the oil patch, for example, Youngstown fields the largest staff of professional service engineers. Wherever there is a market for steel, you'll find the Orange Bands of Youngstown, symbol of quality, service and of a growing force in steel.

Youngstown - growing force in steel

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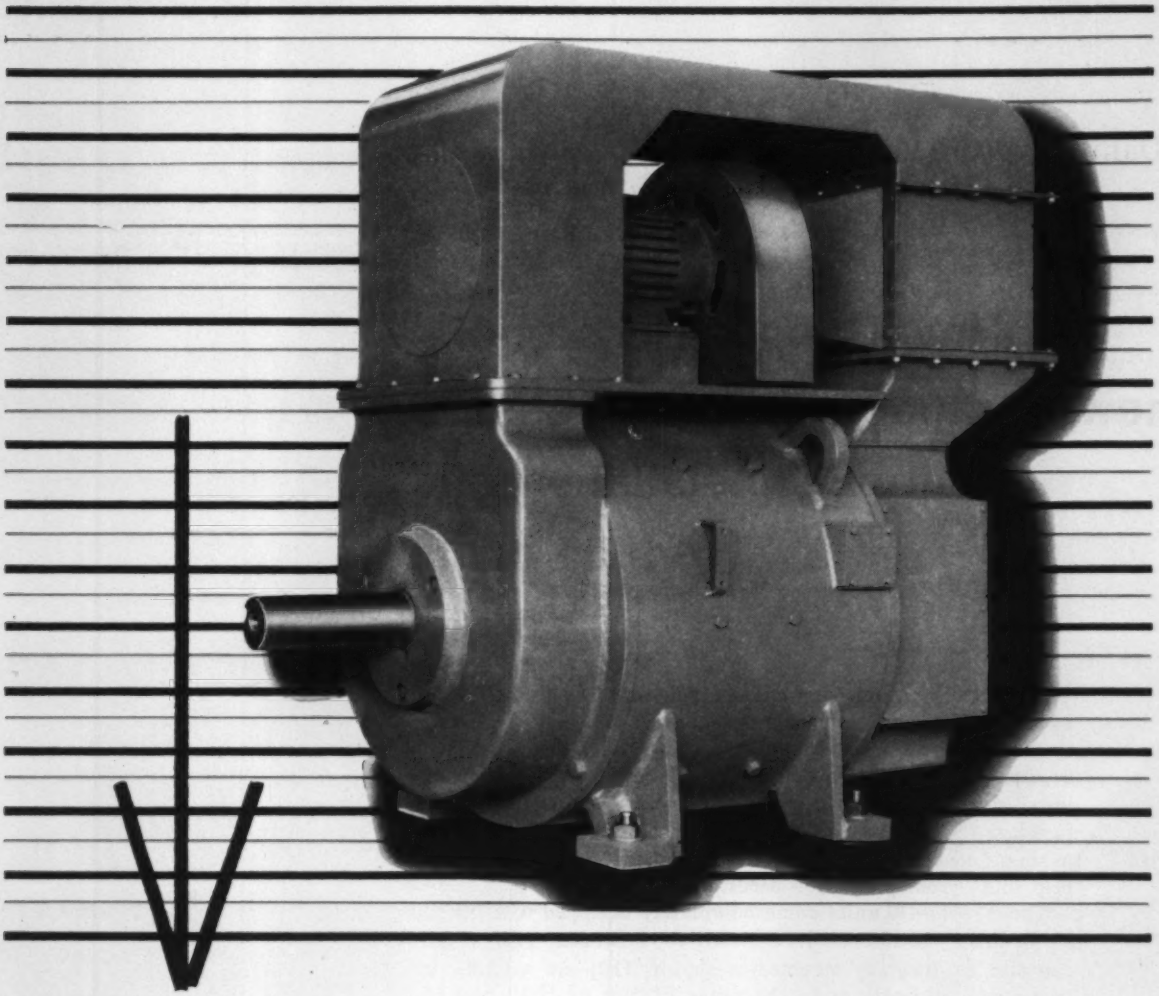

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Totally Enclosed D-c. Motor for LOW SPEED Operating Conditions

Heavy overloads, wide range of operating speeds, dusty atmospheres; that's where the new Super "T" Dual Cooled Motor stands out. It's an enclosed motor with better-than-open operating characteristics.

An independently powered fan pushes ventilating air through the motor and into a heat exchanger. A second fan blows cooling external air across the heat exchanger tubes. Constant ventilation is maintained without introducing outside air into the motor.

The Super "T" Dual Cooled Motor will not overheat even at very low operating speeds. The independent fan motor maintains constant ventilation regardless of the Super "T"s operating speed.

Write today for more information on this new totally enclosed d-c. motor. Available 10 thru 200 hp. C-1606

Product of the combined resources of Reliance Electric and Engineering Company and its Master and Reeves Divisions

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Duty Master A-c. Motors, Master Gearmotors, Reeves Drives, V★S Drives, Super 'T' D-c. Motors, Generators, Controls and Engineered Drive Systems.

Dann Goodson, *Manager Motor-Driven Compressor Sales, The Cooper-Bessemer Corporation, explains...*

How Cooper-Bessemer's new, compact Air Compressors simplify installation and reduce costs

The DMR compressors shown here are two models of a new line of *compact, 720 rpm* machines, unmatched in reliability. With these units, Cooper-Bessemer introduces a new standard of installation economy. So highly compact, the DMR compressors are readily installed in existing space, avoiding the need for additional housing facilities. They can be located at strategic points throughout the plant to supplement existing air line services without additional feeders to help supply your production needs at minimum cost.

The new DMR units come completely equipped with integral motor-drive and intercooler... ready for operation. Their control can also be integrally mounted as shown. They are available for two-stage applications in the range of 500 to 2000 cfm and discharge pressures of 80 to 125 psi... also for single-stage and three-stage operation.

The introduction of this new line of air compressors, plus the portable tool facilities of our new subsidiary, The Rotor Tool Company, enable Cooper-Bessemer to give you full-scope service for your industrial air power needs. Call the nearby Cooper-Bessemer office or air compressor agent for Bulletin No. 94 on the new DMR line.

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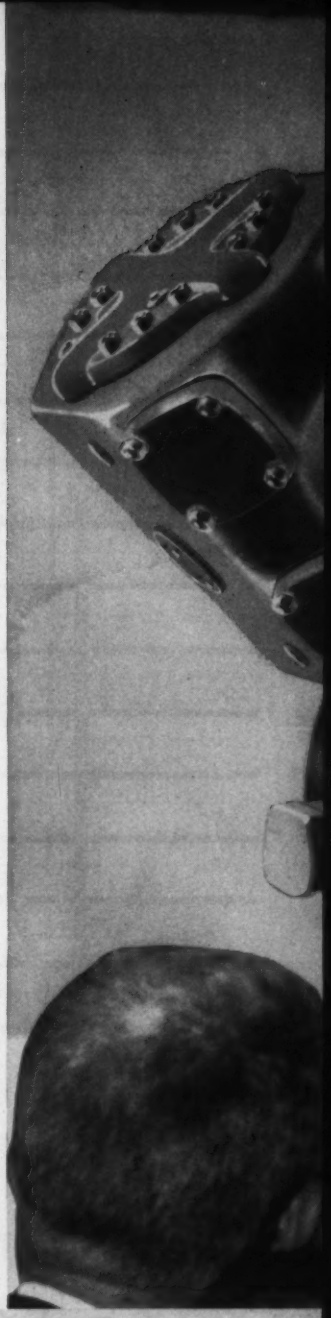

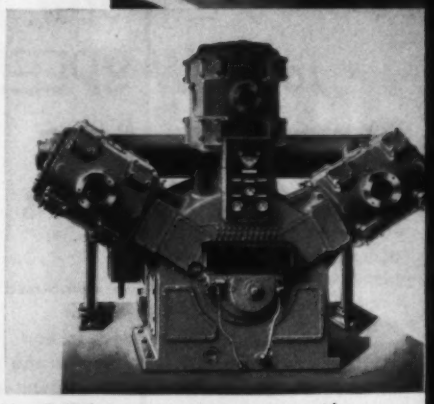

New DMR-3 two-stage air compressor with integral control. Ratings of 300-350 hp.

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COOPER-BESSEMER
DMR-2 TWO-STAGE
AIR COMPRESSOR
WITH
EN-TRONIC CONTRO
100 TO 250 HP

MEN RESPONSIBLE

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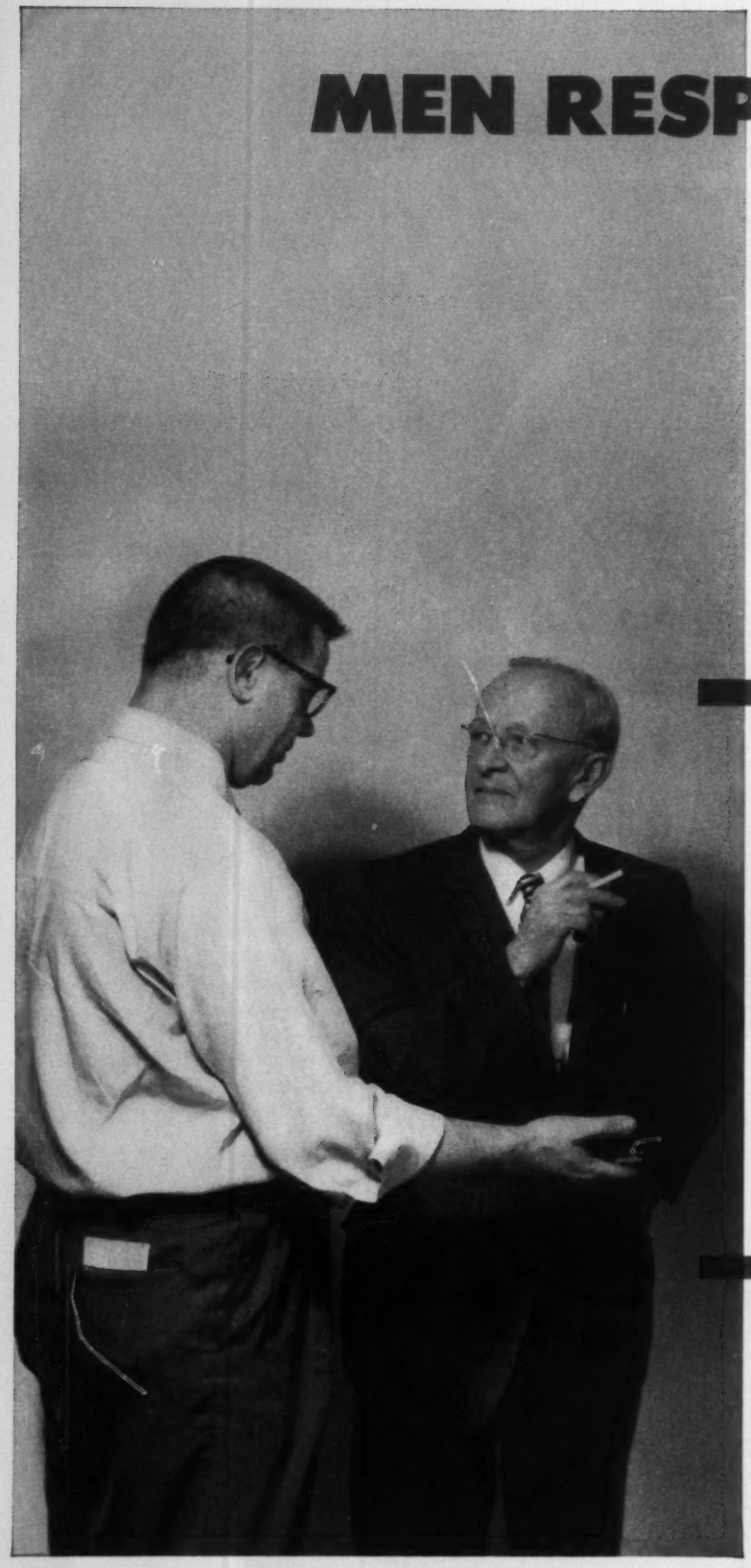

METAL CLEANERS

Newest in the well-known Houghton Line is the versatile and economical Cerfa-Kleen series . . . four new, more efficient metal cleaners to handle most any cleaning problem. Included are powerful new room temperature cleaners which require no special equipment or added operating costs.

FOR METAL CLEANING...

group that knows how much HOUGHTON KNOW-HOW helps!

In The Houghton Line, there's a full range of new, as well as old, established products to solve most any metal cleaning problem. But *making* these products is only half the Houghton story.

More important is Houghton's ability to make them *work for you* . . . job-tailoring each to fit your particular application. Most important, Houghton gives you the benefit of 96 years' experience and research in many areas of metalworking to help solve the immediate problem in yours. That's the unique niche Houghton has carved for itself all over the world. And it's one where our leadership has never been challenged.

Near you there's a Houghton Man whose broad metalworking know-how and on-the-job-'til-it's-done service is yours with every item in The Houghton Line. He's a good man to have on your team. Call him or write E. F. Houghton & Co., 303 West Lehigh Avenue, Philadelphia 33, Pennsylvania.

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CHEMICAL CONVERSION COATINGS

In Houghton's surface conditioning family are materials that clean and phosphate in one operation . . . salts to blacken steel . . . chemicals that provide a phosphate coating to improve bonding characteristics of metal An important feature of each is their simplicity.

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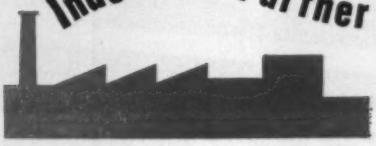
. . . the most valuable help Houghton can give you. More than 100 Houghton sales engineers are backed by skilled laboratory and field technicians, all experts in their fields. Our 96-year reputation rests on the ability and integrity of these men who are truly your Partners in Production.

Industry's Partner in Production



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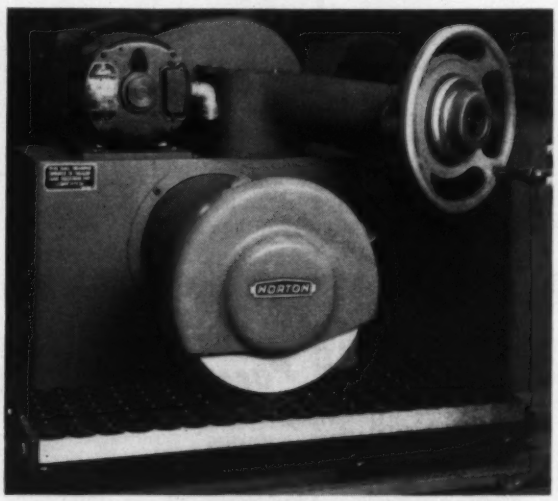
New additions to the newer larger Type S-3 grinder include: (1) *Bigger Work Table*, with work surface 8″ wide, 24″ long; (2) *Interlocking Cross-Feed Hand Wheel;* (3) *Power Cross-Feed;* (4) *Cross-Feed Stop Dogs.* The many job-proved features, *for improving your profits,* include: (5) *Two-Speed, .0001″ Increment Hand Wheel* assuring accurate vertical feed and fast positioning; (6) *Contoured Splash Guards* providing better sighting and loading.

NORTON PRODUCTS: Abrasives • Grinding Wheels • Machine Tools • Refractories • Electro-Chemicals — **BEHR-MANNING DIVISION:** Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes

High-Grind Wheel Head Construction, provides 13¾″ vertical capacity from table top to bottom of standard 10″ diameter grinding wheel, for handling tall workpieces.



125 Feet Per Minute is the Type S-3's high table speed that enables you to produce smoother plane surfaces, cut grinding time and increase production rate.

we're building it bigger!

Norton Type S-3 surface grinder... with proved ability to finish flat faster... Now available in 8" x 24" size

Performance of the new Norton 6" x 18" Type S-3 surface grinder for customers like these . . . Addressograph-Multigraph Corporation, Clevite Corporation, Cleveland Graphite Bronze Division, National Cash Register Company, The Timken Roller Bearing Company, Warner & Swasey Company . . . has made this larger size a necessity.

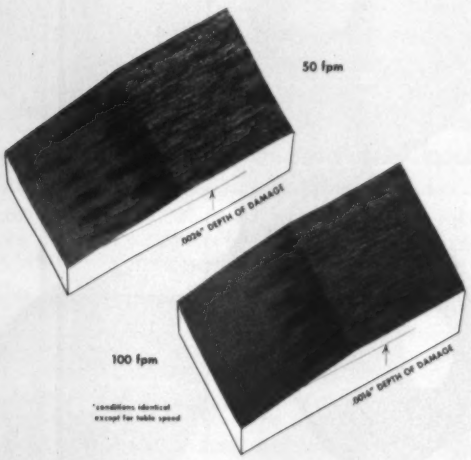
Besides a longer and wider work table, other design advancements enable this top-ranking surface grinder to finish bigger workpieces smoother, faster, at lower cost. Get the whole story from your Norton Sales Engineer, a trained specialist who can help you get better grinds for less money, or ask for our catalog 1982. NORTON COMPANY, Machine Tool Division, Worcester 6, Mass. District Offices: Worcester, Hartford, Cleveland, Chicago, Detroit. *In Canada:* J. H. Ryder Machinery Co., Ltd., Toronto 5.

NORTON

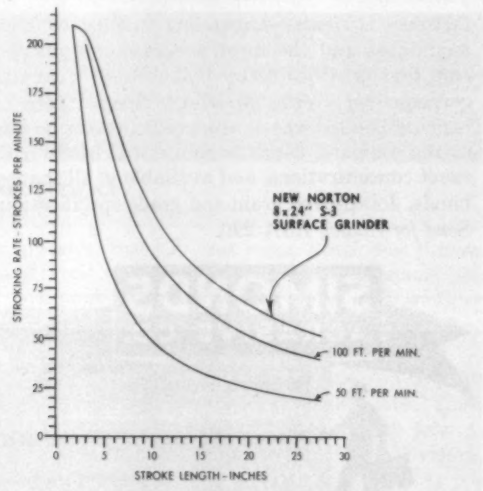
MACHINE TOOLS

75 years of... **Making better products ...to make your products better**

MACHINE TOOL DIVISION: Grinding and Lapping Machines — **G & E DIVISION:** Shapers • Gear Cutting Machines • Gear Induction Hardeners



Better Quality Work due to less heat damage with faster table speeds . . . at the same time greatly increasing the rate of stock removal.



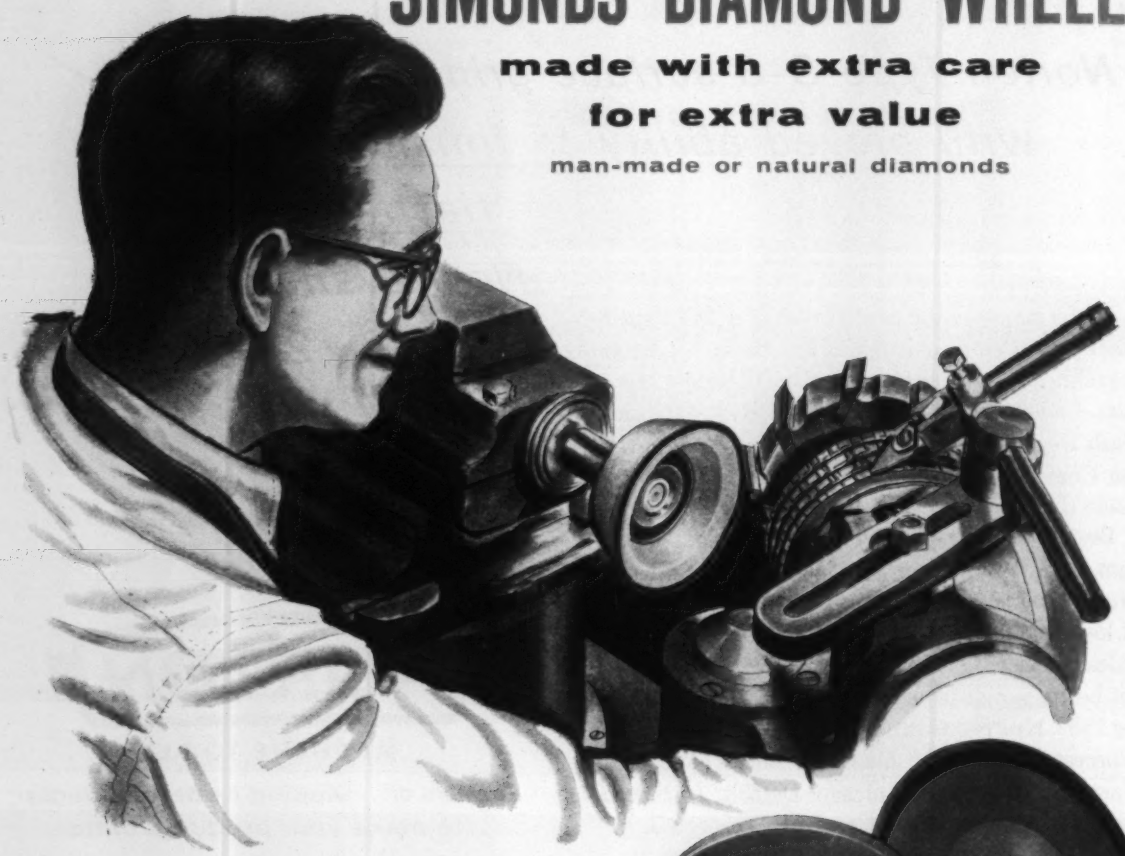
Calculate Your Savings from this Production Rate Chart. Grinding time is reduced in proportion to the increase in stroking rate.

When the job calls for DIAMONDS...say SIMONDS

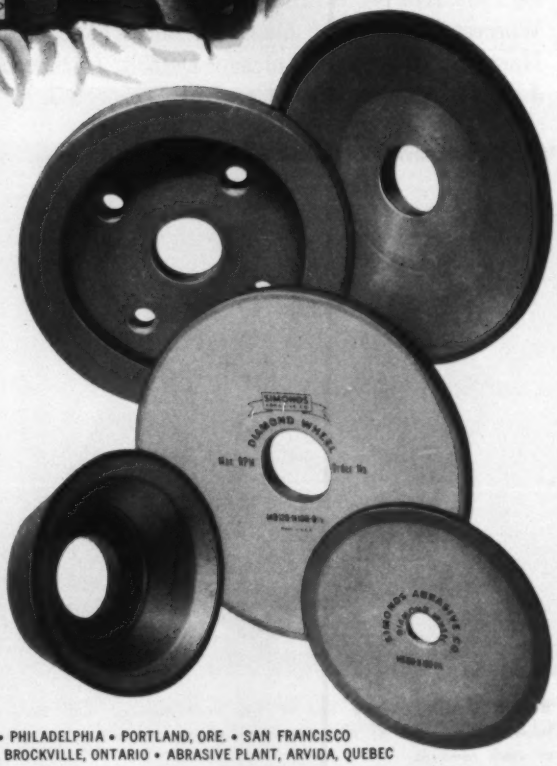
SIMONDS DIAMOND WHEELS

made with extra care
for extra value

man-made or natural diamonds



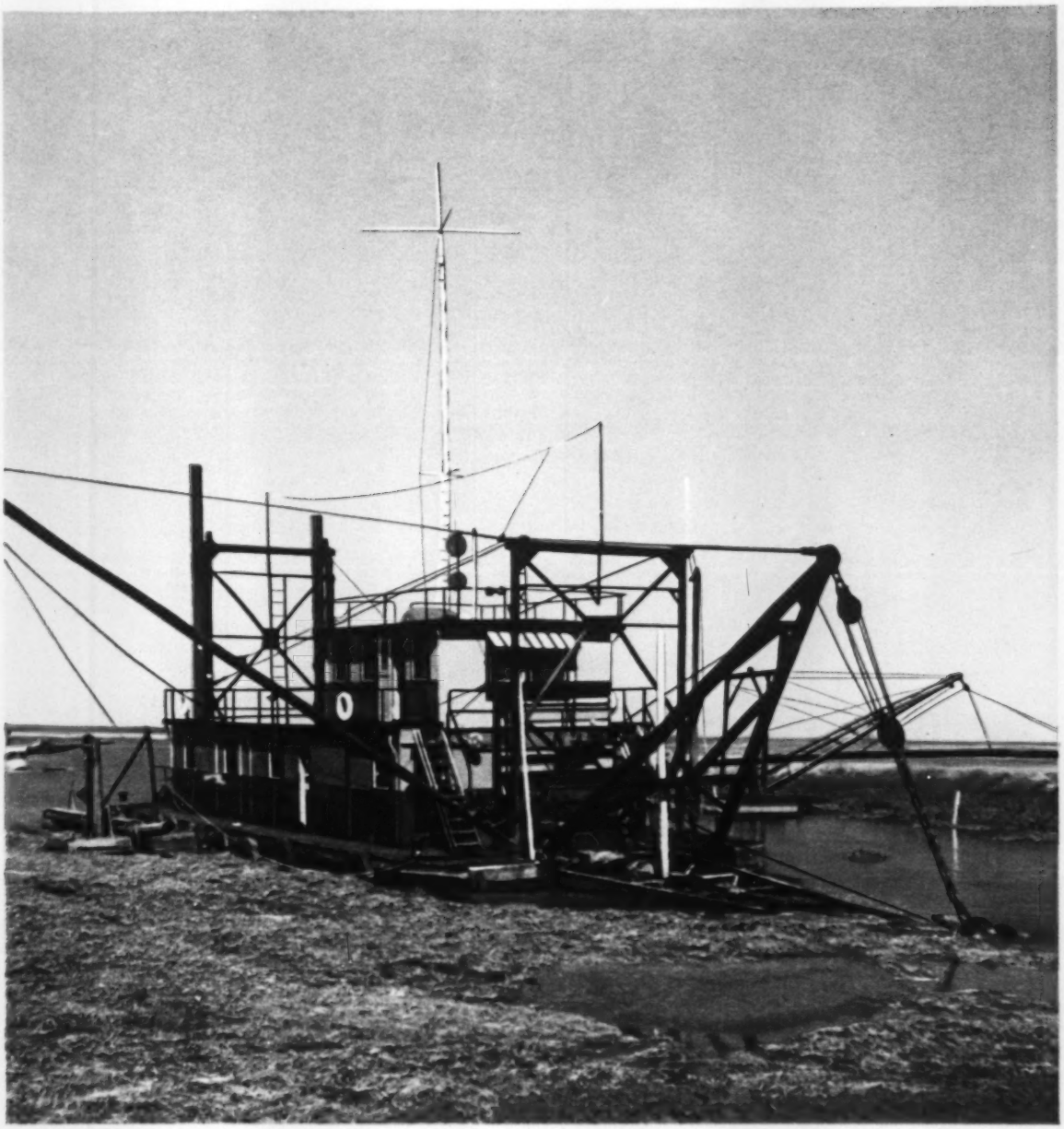
You get *extra* use from Simonds wheels because more of the diamonds are *productively* used for actual grinding. That's due to the extra care that goes into their manufacture . . . extra-demanding quality controls, modern techniques and the most accurate equipment . . . extra care that provides better balance and truer running, and consequently, fewer dressings. Special core material in resinoid bonded wheels also needs little or no dressing back as the diamond depth is consumed. Made with true and exact concentrations, and available in all shapes, sizes and bonds. Job-proved grain and grade specifications.
Send for catalog ESA-290.



SIMONDS ABRASIVE CO.
Tacony & Farley Sts.
PHILADELPHIA 37, PENNA.
Division of Simonds Saw and Steel Co.

COUNT ON / YOUR SIMONDS DISTRIBUTOR
FAST SERVICE • LOCAL STOCKS

WEST COAST PLANT: EL MONTE, CALIF.—BRANCHES: CHICAGO • DETROIT • LOS ANGELES • PHILADELPHIA • PORTLAND, ORE. • SAN FRANCISCO
SHREVEPORT—IN CANADA: GRINDING WHEELS DIVISION, SIMONDS CANADA SAW CO., LTD., BROCKVILLE, ONTARIO • ABRASIVE PLANT, ARVIDA, QUEBEC



way out where wire rope had better be good

There's nothing like isolation to point up the job value of a wire rope. It's situations like this that put meat on the clichéd bones of "tried and true."

This instance—multiplied by hundreds in the gamut of industries—has contributed to the fine and *lasting* reputation of Roebling Royal Blue Wire Rope. A reputation of unparalleled toughness and strength among wire ropes.

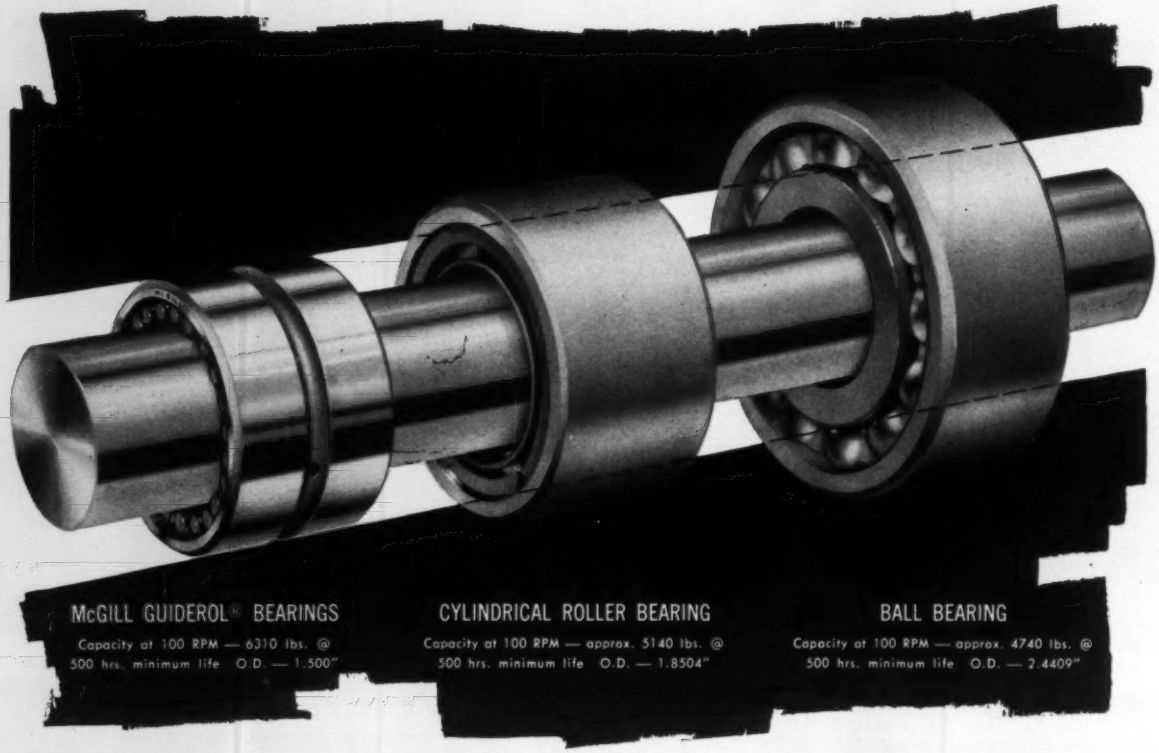
Here, and wherever wire rope is put to work, impact, abrasion, shock and crushing are the "diseases" that kill weak ropes. Royal Blue thrives.

Even if your wire rope distributor were around the corner, you wouldn't be any further ahead with anything less than Royal Blue. You'd be spending more money than you *need* to.

We want very much to show you how *this* rope can save and save and save. Time. Money. Frustration. For this, write John A. Roebling's Sons, Wire Rope Division, Trenton 2, New Jersey.

ROEBLING

Branch Offices in Principal Cities
John A. Roebling's Sons Division, The Colorado Fuel and Iron Corporation

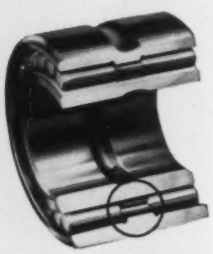

McGILL GUIDEROL® BEARINGS
Capacity at 100 RPM — 6310 lbs. @ 500 hrs. minimum life O.D. — 1.500"
CYLINDRICAL ROLLER BEARING
Capacity at 100 RPM — approx. 5140 lbs. @ 500 hrs. minimum life O.D. — 1.8504"
BALL BEARING
Capacity at 100 RPM — approx. 4740 lbs. @ 500 hrs. minimum life O.D. — 2.4409"

GUIDEROL® BEARINGS SAVE RADIAL SPACE

.....and still offer greater load capacity

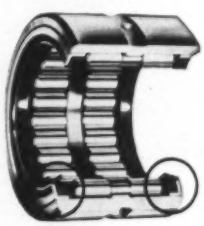
This graphic illustration demonstrates the radial space saving advantages of McGill GUIDEROL bearings that offer still greater capacity than the other two types of bearing compared. For a common 1" shaft, the GUIDEROL bearing GR-16 has an O.D. of only 1½" with a capacity of 6310 lbs. Compared to a cylindrical type roller bearing the GUIDEROL bearing requires ⅜" less housing space and offers 23% more capacity. A ball bearing for the same shaft uses almost an inch larger O.D. to carry 1500 lbs. less radial load.

CENTER GUIDED ROLLERS



GUIDEROL bearings pack more performance into smaller radial space. Their construction offers the inherent high capacity of a full complement needle bearing combined with effective roller control. Center guided rollers limit roller skewing tendencies and prevent binding under adverse conditions in either horizontal or vertical mountings. This qualifies GUIDEROL bearings for applications which are too heavily loaded for retainer type needle bearings, but are subject to misalignment that precludes the use of unguided needle bearings. Standard GR series GUIDEROL bearings are available, with or without inners, in shaft sizes from ⅝" to 9¼" with capacities ranging from 2880 lbs. to 128,670 lbs. (at 100 RPM).

LUBRICATION LOCKED IN, CONTAMINATION OUT; IN SEALED GUIDEROL BEARINGS



Pre-lubricated and sealed SG series GUIDEROL bearings are interchangeable dimensionally with standard GR series GUIDEROL bearings. They offer 5 possible seal combinations. Specify the sealed bearings for applications that are exposed to dust, dirt, grit or where accessibility for lubrication is a problem. Your McGill representative will be happy to assist you with special application problems. Ask him for recommendations or write the McGill Engineering Department.

For Complete Data on Dimensions, Capacities and Application of McGill Precision Needle Bearings, Send for Free Catalog No. 52A.

engineered electrical products

McGILL®

precision needle roller bearings

McGILL MANUFACTURING COMPANY, INC., BEARING DIV., 301 N. LAFAYETTE ST, VALPARAISO, INDIANA

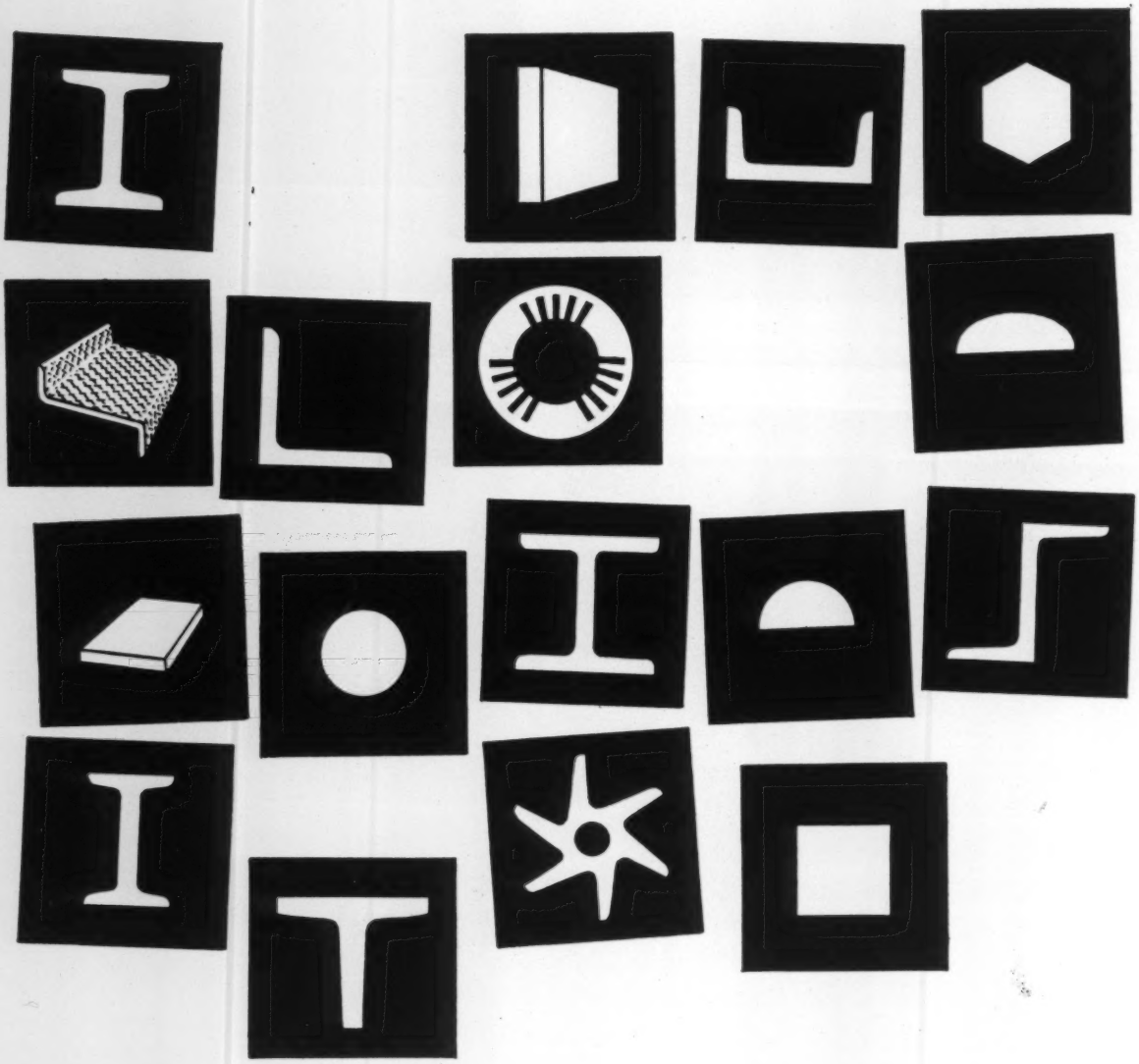
Cold rolled anneal and pickle line at Jones & Laughlin Steel Corporation's Louisville, Ohio plant

Wean, J&L and Stainless . . .

Eleven continuous processing lines at Jones & Laughlin's impressive new stainless plant—*all designed and built by Wean Engineering*—demonstrate the versatility of Wean's abilities in this field. From conditioning of incoming coil, through annealing, pickling and surface treatment, to slitting and cut-up, these Wean lines assure Jones & Laughlin customers top quality stainless strip or sheet to meet the most exacting requirements.

In the design of this equipment, high quality surface finish of the stainless was a prime requisite—one of the reasons Wean was selected to engineer and build this multi-line installation. Whatever *your* requirements in continuous strip processing, you can benefit from Wean's *creative engineering.*

THE WEAN ENGINEERING COMPANY, INC. • WARREN • OHIO



THE METALOGICS OF CARBON STEELS

There *are* differences—very real and important differences—in carbon steels, and in all the services required to supply them. You can always count on Ryerson for more in quantity, quality and quickness—more for your carbon steel buying dollars. So be "Metalogical"—call Ryerson.

METALOGICS
RYERSON PLUS VALUES

STEEL • ALUMINUM • PLASTICS • METALWORKING MACHINERY

RYERSON STEEL®

Joseph T. Ryerson & Son, Inc., Member of the INLAND® Steel Family

PLANT SERVICE CENTERS: BOSTON • BUFFALO • CHARLOTTE • CHICAGO • CINCINNATI • CLEVELAND • DALLAS • DETROIT • HOUSTON • INDIANAPOLIS
LOS ANGELES • MILWAUKEE • NEW YORK • PHILADELPHIA • PITTSBURGH • ST. LOUIS • SAN FRANCISCO • SEATTLE • SPOKANE • WALLINGFORD

How Much Recovery for Machinery Makers?

Producers of machinery have bounced back rapidly from the depths of 1958—and they'll make further gains this year. Some equipment makers will chalk up sales records. To see how much the industry has recovered thus far, check these figures from the Department of Commerce:

(Billions of dollars, seasonally adjusted)

	1957 3d Qtr	1958 4th Qtr	1959 4th Qtr
Producers durable goods expenditures[1]	29.0	23.2	27.5
Sales[1]:			
Machinery, total	52.2	47.7	56.5
Electrical	21.9	20.7	23.3
Nonelectrical	30.3	27.0	33.2
Industrial	13.1	9.7	13.0
New Orders[1]:			
Machinery, total	48.6	48.2	58.6
Electrical	20.0	21.9	24.0
Nonelectrical	28.6	26.3	34.6
Industrial	11.6	9.9	14.6
Unfilled Orders[2]:			
Machinery, total	18.9	16.0	17.8
Electrical	9.8	9.4	10.1
Nonelectrical	9.1	6.6	7.7
Industrial	4.2	2.6	3.4

1. Annual rates. 2. As of end of quarter.

Buyers Foresee Better Business Weather

In the latest survey by the National Association of Purchasing Agents, better than 40 per cent of the respondents reported improvement in both new orders and production. Prices are moving up only slightly, despite boom pressures. Employment is up sharply. Forty-one per cent say they will spend more for capital improvements this year than last; another 34 per cent will spend at least as much.

How to Diagnose Your Needs for New Equipment

Entropy, the industrial disease that stifles production efficiency, has reached epidemic proportions in metalworking. It signals the need for a cure it yourself program through the sound, systematic replacement of production equipment. First step in developing such a program: Detect entropy's symptoms. On Page 53, STEEL reports the sound approaches used by progressive companies to find the need for new equipment.

Westinghouse Device Would Prevent Airline Bombings

Westinghouse Electric Corp. has developed a machine to inspect baggage and packages which would detect concealed bombs, reports Dan Maus, sales manager, Westinghouse X-Ray & Industrial Electronics Div., Baltimore. The firm has been working on such a fluoroscopic device since 1941 but only recently succeeded in reducing the weight and boosting the efficiency to a

point that could make it commercially feasible. It was demonstrated last week to the Air Transport Association and the Senate Aviation Subcommittee, chaired by Mike Monroney (D., Okla.). Capitol Hill is exerting increasing pressure on the airlines to come up with an answer to the bombing problem. If the Westinghouse device provides that answer, it can open a sizable market for metalworking.

Coming? One-Stop Shopping for Metal Finishing

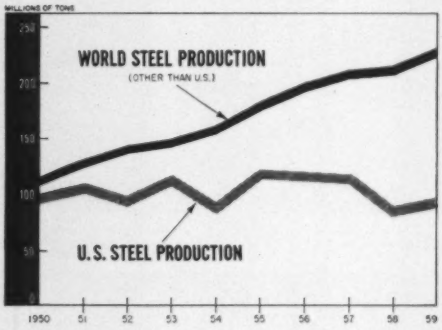
Would you like to sign a contract with one supplier to furnish all your metal finishing needs—materials, equipment, even personnel? That may be possible soon. You would pay the supplier on a "per finished part" basis. Several companies are investigating the concept; Glidden Co. is considering a trial program with some smaller firms. The approach offers some important service benefits, but several road blocks must be removed first (Page 47).

Stockholder Relations Get More Emphasis

More and more companies are recognizing the need for better stockholder relations in view of the broadening ownership of industrial securities. Last week, U. S. Steel Corp. announced the establishment of a new Stockholder Relations Dept. It'll be set up under the corporation's secretary and be headed by Howard C. Johnson, former assistant to the chairman. The department will handle day to day stockholder contacts and provide a focal point through which stockholders' views will be made available to management. USS now has about 315,000 stockholders—an increase of almost one-third in a decade.

World Steel Production Soars, but U. S. Foresees Export Gain

Steelmakers are mapping strategy to regain export markets. Expect 1960 exports to hit 3 million tons (vs. 2 million last year). But foreign steelmakers are expanding rapidly; their production gains are outpacing those of the U. S. (see chart). It signals a tougher fight for world markets (Page 109).



U.S. Is Top Uranium Producer

Domestic uranium production last year totaled 6.9 million dry tons—30 per cent more than in 1958—making the U. S. the top uranium producer in the Free World. The Atomic Energy Commission reports that, even with that increase in production, U. S. uranium ore reserves rose 3.5 million tons to 86 million at yearend.

Ford Executive Wants to "Return Politics to the People"

Merritt D. Hill, vice president and general manager, Tractor & Implement Div., Ford Motor Co., says businessmen must take the lead in returning politics to the people. "I believe that unless present trends are reversed by positive action programs, governmental and political climate will be the most critical of all problems facing businessmen during 1960 and thereafter," he asserts. He recommends three steps: 1. Make politics more popular with people. 2. Inform them about politics and government. 3. Make political activity convenient for them.

Leasing Gains More Popularity

The iron and steel industry leased a record 7500 automobiles in fleets for its salesmen last year, reports Wheels Inc., Chicago. The firm says leased autos now comprise 34 per cent of the cars used in the industry. Another 30 per cent are company owned. The remaining 36 per cent are owned by salesmen. Wheels predicts a 15 per cent increase in leasing volume this year . . . Hertz Corp. announced last week that it is entering the equipment leasing field through a new subsidiary, Hertz Equipment Leasing Corp. It will stress items such as fork lifts, bulldozers, interchangeable containers, and aircraft maintenance equipment.

52-Year-Old Mill Sets Production Records

A 52 year old, steam driven, blooming mill at U. S. Steel Corp.'s Ohio Works (Youngstown) broke production records four times last month in the drive for maximum production. On Jan. 4, it rolled 1734 tons to shatter the old record. Then, it rolled 1744 tons on Jan. 20, 1801 tons on Jan. 26, and 1894 tons on Jan. 27.

Ultrasonic Welding Solves Tough Joining Problems

Ultrasonic welding promises better joints in dissimilar metals. Many hard to handle combinations are being mated readily. Junctions are free from interdiffusion, intermetallic compounds, and brittleness. Material thicknesses are limited but developments on the way show promise (Page 78).

Water Needs Will Surge by 2000

The nation's industrial and municipal water requirements will skyrocket from 140 billion gallons a day in 1954 to 419 billion daily by 2000, indicates a

OUTLOOK METALWORKING

preliminary government estimate. By 1980, requirements will hit 246 billion gallons daily. The Commerce Department estimates that the six major water using industries will need 73 billion gallons daily in 1980 and 169 billion in 2000 (vs. 21 billion in 1954).

New System Gives You Computer Results Faster

You can translate computer results faster with a new printer-plotter system developed by Briggs Associates Inc., Norristown, Pa. Designed around a recorder and driver unit (picture) built by Hogan Faximile Corp., the system plots out graphical and printed data at 300,000 points per minute from magnetic tape. It'll plot ten curves on a chart while drawing its own grid lines, marking title blocks, and recording other information. Maximum printing speed: 4000 lines per minute. Cost: About $300,000.

Minuteman ICBM Contractors Selected

Here are the major contractors selected by the Air Force for the Minuteman ICBM: Nose cone—Voco Mfg. Co. First stage propulsion production—Thiokol Chemical Corp. Second stage propulsion production—Aerojet General Corp., with Thiokol backup. Third stage propulsion development—Hercules Powder Co. and Aerojet. Guidance—Autonetics Div., North American Aviation Inc. Railroad cars for mobile version of the Minuteman—American Machine & Foundry Co. and ACF Industries Inc.

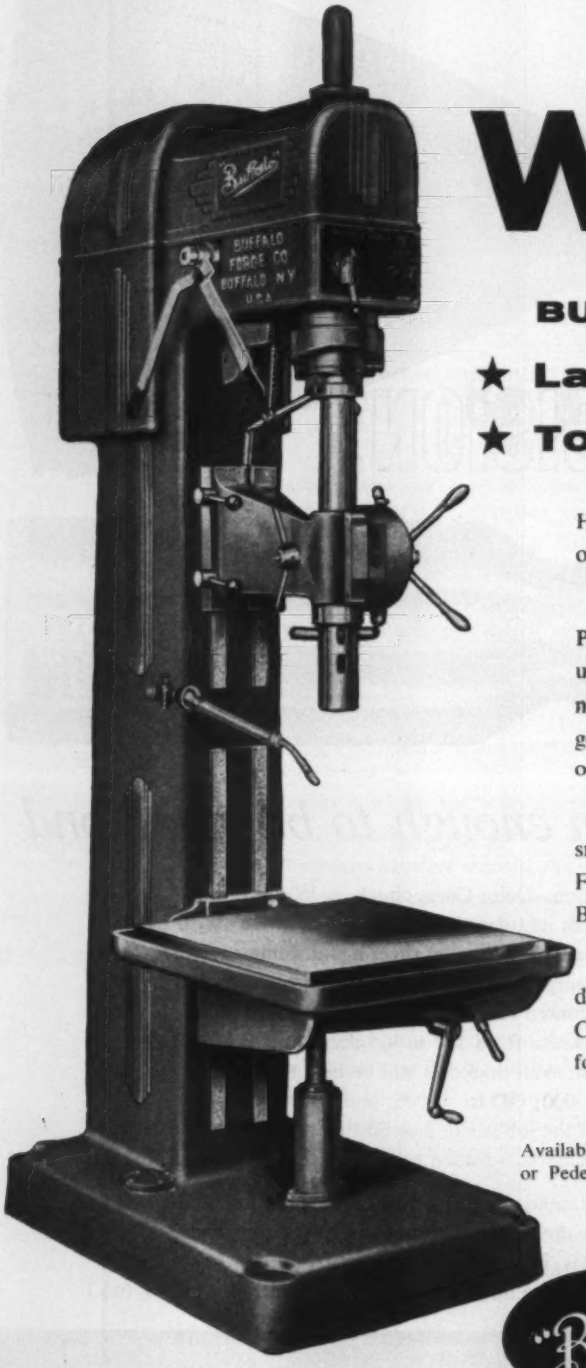
API Predicts Wider Use of Pipelines

Look for many more kinds of material to be transported by pipelines in the future. So predicts the American Petroleum Institute, which suggests that turpentine, fruit juice, and milk could be moved that way. It adds that any solid which can be suspended in a liquid could be so moved—"even people."

Straws in the Wind

"Ten years from now, we will say that military space operations are easier than operating in the atmosphere," predicts Maj. Gen. Leighton I. Davis, assistant deputy chief of staff for Air Force development . . . 1959 shipments of industrial fasteners were 17 per cent greater than those of 1958, but 10 per cent below the 1957 level, reports Industrial Fasteners Institute . . . Machinery Dealers National Association reports that its index of used machine tool sales averaged 135.4 last year vs. 114.5 in 1958 (1947-49 = 100) . . . Indication of rosy outlook for makers of heat treating equipment: Ward A. Wickwire Jr., president, Salem-Brosius Inc., Pittsburgh, told STEEL his firm's industrial furnace bookings this year may reach $14 million (vs. $10.5 million in '59) . . . Ford's new comet will initially be produced only at Lorain, Ohio, where it will represent 60 per cent of the plant's total output . . . Manufacturers' inventories expanded $700 million in December to $52.3 billion . . . On Jan. 1, consumer instalment debt totaled $39.5 billion—up $5.4 billion from a year earlier . . . Allied Chemical Corp. plans capital spending of $85 million this year—more than double 1959 outlays.

THEY ALL SAID, "You just can't improve the R-P-Mster!"



WE DID!

BUFFALO No. 3A R-P-Mster

★ Larger 2" Capacity

★ Torque-Controlled Feed

Here's a new Buffalo R-P-Mster with a full-rated capacity of 2" in mild steel.

Another important feature is Torque-Controlled Power Feed, exclusive with Buffalo. This enables you to use maximum speed and feed for any given hole size. You never need worry about damaging the drill or machine gearing. Overloading is impossible with the torque control on the feed shaft.

The No. 3A R-P-Mster brings you new highs in smoothness, accuracy, quiet operation and drilling ease. Fingertip controls change speeds quickly and easily. Quality Buffalo construction assures long, trouble-free life.

Discover for yourself how you can increase your drilling efficiency with the improved No. 3A R-P-Mster. Contact your Buffalo machine tool dealer today, or write for Bulletin 3257-C.

Available in Multiple Spindle or Pedestal Models.

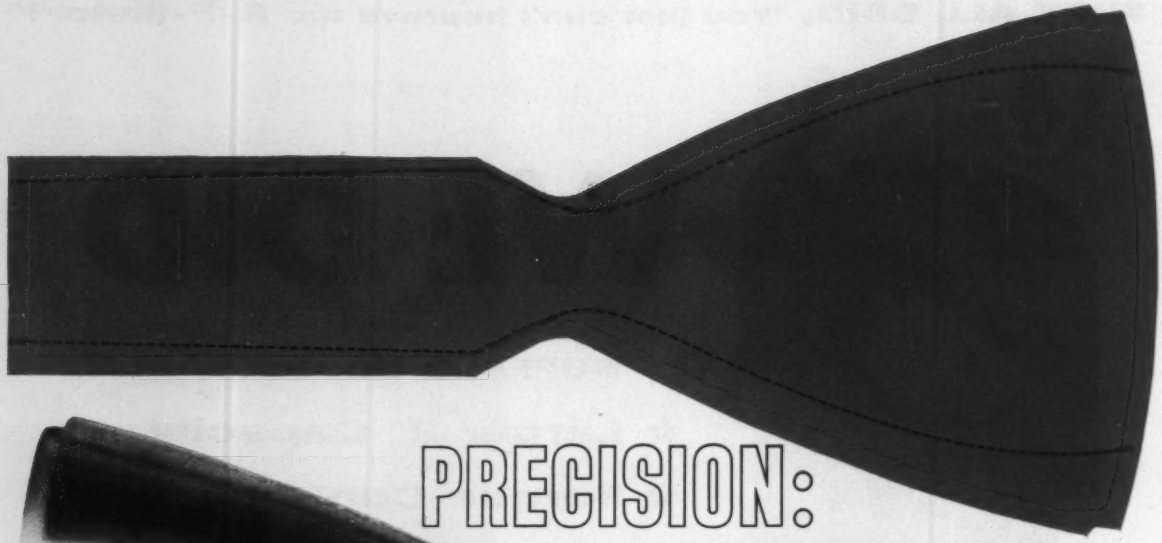
"Buffalo"

BUFFALO FORGE COMPANY

158 MORTIMER • BUFFALO, NEW YORK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

DRILLING • PUNCHING • SHEARING • BENDING

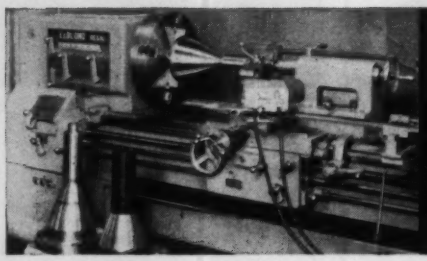


PRECISION:

Reason enough to buy LeBlond

In Hartford, Conn., Delta Corp. chucks a 350 lb. forging of 347 stainless in its tracer-equipped, 24″ LeBlond Regal Lathe. Delta is a specialist in precision sheet metal weldments and exacting machining jobs. When this job comes off the Regal it will be a contoured tube weighing only 18 lb. Its walls will vary in thickness from ⅛″ to 1/16″ according to a rigid and complex pattern. Wall thickness will be held to ±.003″; ID to —.001 +.000; OD to ±.008; and finish will be 20 to 30 rms. If the job is run 3 or 30 times, the same precise result will be achieved—reason enough to buy a LeBlond.

You never hesitate to put this kind of work on a LeBlond Lathe. You know that the sturdiness, the horsepower, the precision is there when you need it. It's what you'd expect from the world's largest builder of a complete line of lathes (and of tracers for lathes, too.)



THE R. K. LeBLOND MACHINE TOOL COMPANY
Cincinnati 8, Ohio

LeBLOND *of Cincinnati*

Be a Yankee Trader!

In talking with Secretary of Commerce Frederick H. Mueller a few days ago, it quickly became evident that our government is reshaping its foreign trade policy. Relative indifference is being replaced by benevolent concern.

Back of the change is the realization that the U. S. imports more goods than it exports and, in many products, is pricing itself out of the world market.

As a consequence, the deficit in our international accounts in the last two years made it necessary to transfer $4 billion in gold and liquid assets to other countries.

Such deficits, in the interest of our internal economic stability, must be eliminated by increasing our exports enough to offset imports and our monetary obligations abroad.

And that is where you come in as a manufacturer!

You will be urged—and aided—in expanding your business in other countries.

As Secretary Mueller sums it up, industry will need to apply the "hard sell."

This means more market research, overhauling foreign distribution setups, better service, and, above all, the development of products that will have acceptance.

In your search for customers, you can expect more assistance from your nearby Department of Commerce field office; the Trade Development Division of the Bureau of Foreign and Domestic Commerce; and from a growing list of diplomatic and consular posts in Africa, Latin America, South Asia, and Europe.

Additional help will come from relaxed import quotas and currency restrictions, U. S. participation in the General Agreement on Tariffs and Trade, and easier credit through international banks.

The outlook is good: The National Foreign Trade Council predicts that 1960 exports will rise sharply to $18.1 billion vs. $16.1 billion in 1959; imports will edge up only slightly, $15.9 billion vs. $15.3 billion in '59.

Don't get the impression that foreign business has suddenly become a pushover.

It still requires the ingenuity of a Yankee trader—but the payoff will be worthwhile!

Irwin H. Such

EDITOR-IN-CHIEF

3 All New electric

. . . to make

FEATURES:

- Wide band adjustments: 0 to 500% prop. band, 0 to 100 repeats/min. reset, and 0 to 10 min. rate.
- Bumpless transfer even when control output is changing.
- Change proportional band any amount without upsetting process.
- Rate action circuit minimizes overshoot in batch process and during startup.
- Pull-out chassis for servicing without interrupting operation.
- Modular construction simplifies maintenance and stocking.
- Plug-in silicon diode rectifiers for greater reliability.

All three units use the same plug-in components . . . only the control output section is different. Simplifies on-the-job servicing . . . eliminates need for complicated test equipment.

3-mode control units

furnaces perform at their best

***Electr-O-Line* Control Unit**—For electronic position-proportioning control with reset and rate action

***Electr-O-Pulse* Control Unit**—For electronic time-proportioning control with reset and rate action

***Electr-O-Volt* Control Unit**—For electronic current output proportioning control with reset and rate action

One of these units—*Electr-O-Line*, *Electr-O-Pulse* or *Electr-O-Volt*—will deliver the exact kind of temperature control that's best for your furnace.

Plug-in construction is used throughout all three units—including common amplifier and power supply sections. Operator adjustments are exactly alike for all three units. Interchangeability of control output sections simplifies stocking and service problems.

Get complete details on these and other types of furnace controls from your nearby Honeywell field engineer. Call him today . . . he's as near as your phone.

MINNEAPOLIS-HONEYWELL, Wayne and Windrim Avenues, Philadelphia 44, Pa.

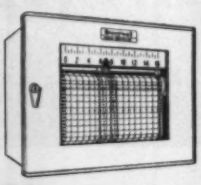
Honeywell

First in Control

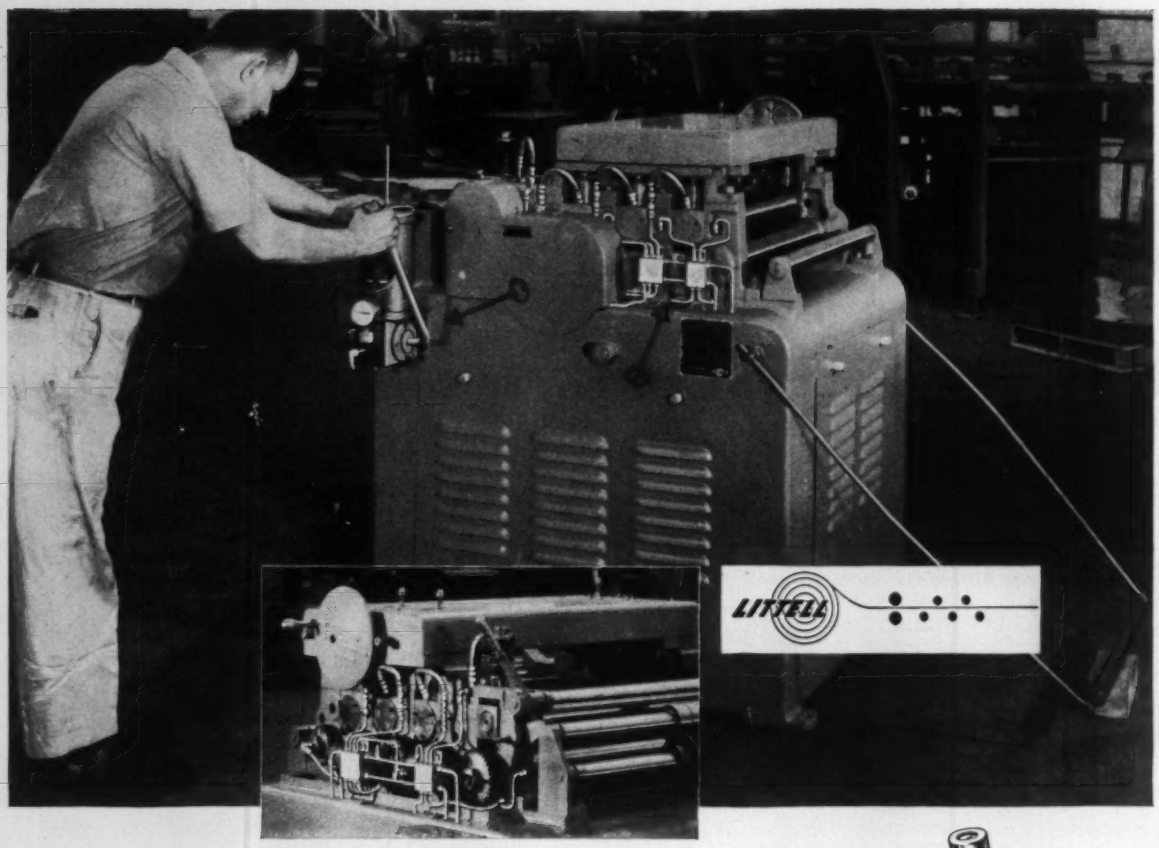
SINCE 1885

75th YEAR

PIONEERING THE FUTURE



Use *ElectroniK* strip chart, circular chart or circular scale controllers to actuate *Electr-O-Line*, *Electr-O-Pulse* or *Electr-O-Volt* units. They are integrally mounted, simplifying panel cutout and reducing wiring costs.



Farval Centralized Lubrication on Littell Straightening Machine Eliminates Down-time, Saves Bearings

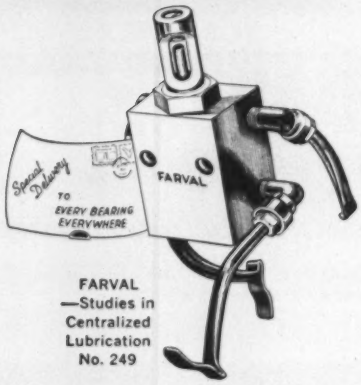
This versatile No. 424 Littell Machine straightens coiled steel stock .050" thick by 24" wide, and automatically supplies a free loop of pre-straightened stock at proper speeds required for smooth, efficient punch-press operation—even through the most complicated progressive dies.

Keeping press output at top level allows no down-time for the Littell No. 424 straightener. Its built-in Farval Manual Dualine System protects the machine's 24 most important bearings—keeps them adequately lubricated while the machine remains continuously on the job.

On industrial equipment all over the world, Farval delivers measured amounts of clean lubricant at regular intervals to all vital bearings. From a central station, lubricant is pumped under pressure to a measuring valve at each bearing, providing the exact amount of lubricant desired.

If you want your production equipment to stay in top-operating condition—to reduce costs, boost profits—then write for free Bulletin 26-S. It tells the complete "Farval Story".

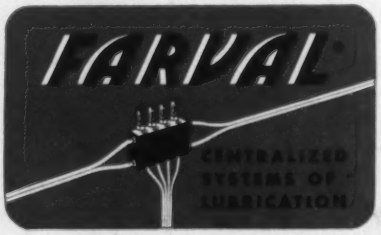
Farval Division • Eaton Manufacturing Company
3270 East 80th Street • Cleveland 4, Ohio



FARVAL
—Studies in Centralized Lubrication
No. 249

KEYS TO ADEQUATE LUBRICATION

—wherever you see the sign of Farval —the familiar valve manifolds, dual lubricant lines and central pumping station—you know a machine is being properly lubricated. Farval manually operated and automatic systems protect millions of industrial bearings.



In the Earning Prospects for 1960

Plus Factors Outweigh

- Inventory Rebuilding.
- High Level Auto Production.
- Rising Capital Equipment Outlays.
- Increasing Backlogs.
- High Level Construction.

Minus Factors

- Expected Decline in Housing Starts.
- Weakening Farm Income.
- Tight Money.

1st Half Profits Head for Record

METALWORKING'S profits will continue to swing upward at least until midyear. You'll see a rash of records posted in the first half.

Settlement of the steel strike cleared the way for at least three of the major forces behind the upturn:

• Inventory rebuilding is a major impetus to current production activity.

• Automakers are still targeting for production of 2.25 million cars in the first quarter.

• Steel firms and other metalworkers are firming up capital equipment expenditure programs, many of which were held up during the strike.

• **Inventories**—"Some 3 per cent of current production may be going into inventories," reports the Chase Manhattan Bank. "That seems like a small amount, but a dollar spent to build inventories has a multiplier effect—it adds to incomes which are spent on other goods and services. Roughly, an additional dollar of inventory buying operates to increase total national production by $3, including the dollar going into inventories."

• **Autos**—But some observers are taking a new look at the inventory buying momentum. They feel that much of its steam will be spent by April and a leveling off will begin. Another factor: Auto sales haven't yet matched expectations, and automakers may soon revise production schedules downward.

• **Capital Equipment**—High level business and good earning reports should add strength to the outlook for capital equipment. If the trend continues, it's possible that capital investment could take over as the prime mover of the economy in the last half. Martin R. Gainsbrugh, chief economist for the National Industrial Conference Board, told the Congressional Joint Economic Committee last week:

The delayed upsurge in capital outlays "could provide sufficient impetus to propel the economy upward through 1961 and perhaps 1962—well beyond the turning point currently envisaged by many business analysts."

New orders for machine tools in 1959 bounced up to $659.4 million from the $373.3 million in recession-plagued 1958. Backlogs at year-end stood at 4.8 months.

• **Spending Outlook** — Company annual reports indicate substantial capital spending plans. Arthur B. Homer, Bethlehem Steel Corp.'s president, reports that his firm will spend $172 million on improvement and expansion programs this year compared with last year's outlay of $86.7 million. Crucible Steel Co. of America will spend $30 million. American Steel Foundries expect expenditures to hit a record $12 million in its fiscal 1960, up nearly 50 per cent over 1959.

Railroads provide both a bright spot and a question mark in the 1960 business picture. The plus factor is the $1.5 billion the Class I railroads expect to spend this year vs. $855 million in 1959.

The question mark in the rail-

Metalworking's '59 Profits Snapped Back

(Net income)

SELECTED MANUFACTURERS	1959	1958
Aeroquip Corp.	2,711,280	896,458
Aerojet General Corp.	8,203,323	6,027,827
Air Reduction Co. Inc.	14,850,600	13,349,885
American Can Co.	40,143,000[2]	37,300,262
American Steel Foundries	7,168,027	4,524,393
Avco Mfg. Co.	9,588,416	9,556,090
Borden Corp.	1,215,192	649,419
Bendix Aviation Corp.	27,404,274	21,171,902
Budd Co.	10,748,483	2,011,876
Carrier Corp.	8,266,000	7,548,000
Case (J. I.) Co.	6,200,111	4,313,780
Caterpillar Tractor Co.	46,704,000	32,239,831
Chain Belt Co.	4,704,000	3,879,000
Clark Equipment Co.	12,000,000*	6,449,000
Continental Copper & Steel Industries Inc.	773,972[1]	1,339,150
Cooper-Bessemer Corp.	5,425,903	3,308,892
Deere & Co.	48,450,751	42,067,089
Eagle-Picher Co.	4,671,646	2,090,094
Fairbanks, Morse & Co.	1,800,000	824,000
Ferro Corp.	3,331,000	1,986,000
Foote Bros. Gear & Machine Corp.	1,341,582	294,566
Freeport Sulphur Co.	14,477,796	13,084,067
Gar Wood Industries Inc.	152,131	503,303
General Instrument Corp.	1,378,233[2]	960,717
General Steel Casting Corp.	2,018,499	2,232,709
IBM Corp.	145,633,212	126,191,858
International Harvester Co.	76,416,000	42,987,000
Johns-Manville Corp.	31,616,000	23,274,000
Joy Mfg. Co.	5,028,572	4,166,204
Kaiser Aluminum & Chemical Corp.	22,328,000	25,232,000
Kennecott Copper Corp.	57,326,379	60,120,513
Koehring Co.	2,386,153	1,165,266
Koppers Co.	5,425,220	6,609,257
Miehle-Goss-Dexter Inc.	4,570,091	3,461,910
Mueller Brass Co.	1,919,075	1,501,290
North American Aviation Inc.	30,726,134	26,786,294
Oliver Corp.	3,654,897	2,594,381
Outboard Marine Corp.	13,785,000	9,095,000
Parker-Hannifin Corp.	1,503,279[2]	1,139,059
Philco Corp.	7,162,000	2,874,000
Porter (H. K.) Company Inc.	6,731,885	3,481,475
Pittsburgh Metallurgical Co. Inc.	801,167[3]	865,771
Raytheon Mfg. Co.	13,481,000	9,403,000
Reliance Electric & Engineering Co.	4,236,000	3,773,000
Rockwell Mfg. Co.	9,720,000	7,417,000
St. Joseph Lead Co.	6,263,076	3,986,880
Standard Forgings Corp.	668,589	184,317
Sundstrand Corp.	3,750,000	3,264,792
Steel Improvement & Forge Co.	257,556	166,055
United Engineering & Foundry Co.	6,073,193	6,909,111
Westinghouse Electric Corp.	85,947,000	74,772,000

1. Reflects change to LIFO.
2. 9 mo results.
3. 6 mo results.
*Estimated.

Steelmakers: Earnings Good Despite Strike

(Net income)

SELECTED COMPANIES	1959	1958
Acme Steel Co.	3,504,135	5,307,200
Alan Wood Steel Co.	4,856,000	2,109,000
Allegheny Ludlum Steel Co.	11,290,664	5,844,803
Armco Steel Corp.	76,849,800	57,512,151
Bethlehem Steel Corp.	117,235,859	137,741,946
Colorado Fuel & Iron Corp.	4,364,554	2,147,223
Copperweld Steel Co.	5,972,457	2,081,114
Crucible Steel Co. of America	6,106,443	4,274,793
Granite City Steel Co.	16,142,000	9,374,000
Inland Steel Co.	48,354,030	47,869,042
Jones & Laughlin Steel Corp.	29,485,000	23,198,000
Laclede Steel Co.	5,632,652	3,704,251
Lone Star Steel Co.	14,175,000	1,064,697
National Steel Corp.	54,897,360	35,827,414
Republic Steel Corp.	53,890,116	61,921,680
U. S. Steel Corp.	253,975,656	301,558,231
Wheeling Steel Corp.	7,033,000	8,899,000
Youngstown Sheet & Tube Co.	30,959,040	21,501,320

road outlook, of course, is whether there'll be a strike and what impact it'll have on the over-all economy.

• **Profit Squeeze**—Pressure on prices and tight money could put the squeeze on profits in the second half, believe many metalworkers. Wage costs are increasing. And so is resistance to price boosts on consumer as well as industrial products. Roger Blough, U. S. Steel Corp.'s chairman, said first quarter earnings will be affected by higher employment and other costs. Most metalworkers reflect the thinking of Zenith Radio Corp. officials: The company will try to hold the line on prices this year, but much depends on anticipated steel price hikes (how much and when).

• **Tight Money to Stay** — Among the economists presenting their views to the Joint Economic Committee was Roy L. Reierson, chief economist of the Bankers Trust Co. He reported that most of the upward push on interest rates is behind us, but he sees no major money easing unless business falls off.

The 25 per cent increase in industrial construction and 16 per cent boost in commercial construction expected this year should offset any sales metalworking will lose because of the drop in housing starts. George Cline Smith, F. W. Dodge Corp. added an optimistic note to housing last week. He feels the housing experts were too pessimistic in their forecasts—Mr. Smith thinks new starts will top 1.2 million.

The prospects for a decline in the farm economy shouldn't have too big an impact on farm equipment sales. International Harvester Co. officials feel 1960 sales volume should hold to 1959 levels. Deere & Co. executives are slightly more conservative and predict "moderately less" sales.

1960 Shapes Up as Another Troubled Year in Labor

ON THE LABOR FRONT, industry will be busy in 1960 trying to work off the inferiority complex generated by the steel settlement.

Because more than half the cost of the steel package will go toward fringes, this will be a "fringe" year in most bargaining, observers believe.

• **What Labor Wants**—The 7 cent yearly wage gain won in steel will be labor's 1960 target in other industries. In the fringe areas, union emphasis will be on cost-of-living increases, higher pensions, more insurance (with all the cost paid by the employer), and more liberal Supplemental Unemployment Benefits.

Labor leaders will fight any attempts to change work rules and will pooh-pooh all charges of featherbedding.

• **What Management Wants**—Despite the torpedoing of the work rules issue in steel, industry will still try for reform in 1960. Outlook for success: Poor.

On the economic side, labor experts believe the pattern for 1960 will be about a 10 to 12 cent package concession to workers. The split will be approximately half in wages and half in fringes.

• **Spotlight on 3,750,000**—Collective bargaining agreements covering more than 3,750,000 workers will expire, reopen for wage negotiations, or provide wage adjustments during the year.

Biggest parleys involve the railroads, covering 850,000 members of the brotherhoods. They won't reach a climax until the parties exhaust the involved procedures of the Railway Labor Act sometime in early summer. Little progress has occurred thus far.

• **Troubles in Missiles, Aircraft**—Ominous, too, are prospects in the missile and aircraft industry. Nearly 275,000 members of the International Association of Machinists and the United Auto Workers have contracts expiring between April and June. The two unions have formed a significant co-ordinating committee to present joint demands, which are large. Strikes are possible. If they come, look for the Taft-Hartley injunction procedure to be used again.

General Electric Co. and Westinghouse Electric Corp. face contract expirations with five unions next October—International Union of Electrical Workers, IAM, UAW, Brotherhood of Electrical Workers, and the Federation of Technical Engineers. They, too, have joined forces (representing 173,000 members) to press demands such as a big wage hike, SUB, and a reduced workweek with no cut in pay. A T-H injunction would be possible if both companies are struck because both are major defense suppliers.

• **Mop-up in Steel**—The steel industry was almost completely signed up with the United Steel Workers last week. Pittsburgh Steel Co., the largest firm taking exception to Jan. 4 terms, O.K.'d an agreement that parallels the general steel pact except for a special provision on incentives. A two man committee representing the two sides has until July 15 to work out a solution to out-of-balance incentives which have pushed Pittsburgh Steel's employment costs 46 cents an hour higher than the industry average. If no satisfactory answer is found, the union presumably has the right to strike next summer.

Some 2300 workers at Northwestern Steel & Wire Co., Sterling, Ill., last week were expected to approve a new contract that parallels the general agreement.

U. S. Steel Corp.'s U. S. Steel Supply Div. also signed. But unlike contracts in basic steel, the expiration date is Aug. 31, 1962, not June 30.

About 4200 workers at McLouth Steel Corp. were expected to vote for a new agreement late last week. It's another parallel to the general steel pact, except for special terms on incentives and seniority.

Joseph T. Ryerson & Son Inc. was still negotiating at press time.

Labor Force Gets Younger

Young people entering the labor force in the 1960s will provide one of the country's most challenging problems. This year, 2.6 million will reach the age of 18. By 1965, the number will increase to 3.8 million annually.

That is one of the projections made in the Labor Department's new study, Manpower—Challenge of the 1960s. Other significant statistics:

• The labor force will increase from today's 73.6 million workers to 87 million by 1970.

• Industries in which employment will grow the fastest include construction, finance, insurance, and real estate. Faster than average employment growth will take place in government, trade, and other services.

• Makeup of the work force will change: Professional and technical people will increase 40 per cent, proprietors and managers 25 per cent, clerical and sales 30 per cent, skilled 25 per cent, service workers 25 per cent.

Wages Rise 9 Cents in '59

Union-management negotiations resulted in average wage increases of nearly 9 cents an hour in 1959, reports the Bureau of National Affairs Inc. That was about the same as the average settlement figure in 1958. The unions chalked up 10 cents plus in 1957.

Negotiating for long term contracts gained in popularity. About 40 per cent of last year's settlements fixed wage rates for more than a year compared with 24 per cent in 1958.

Wage boosts in nonmanufacturing companies averaged 11½ cents an hour while those in manufacturing firms equaled just over 8 cents. Only three out of every 100 settlements left wages unchanged.

Signing control system contract: W. D. McDonnell (left) for Great Lakes Steel Corp. and Chalmer E. Jones for Daystrom Inc.

New Hot Strip Mill Gets Computer Control

DETAILS OF WHAT'S said to be one of the world's fastest and most accurate continuous hot strip mills have been revealed by Great Lakes Steel Corp., a subsidiary of National Steel Corp.

Signing a contract for an automatic control system for the mill were W. D. McDonnell, president of GLS and Chalmer E. Jones, vice president-general manager, Control Systems Div., Daystrom Inc.

Heart of the system is a completely transistorized computer which will control all operations from the time slabs enter the line until they emerge in rolled coils, the finished product.

The system, which carries a guarantee of operational availability of 99 per cent during the first six months after installation, has two basic inputs:

1. It will monitor 200 key points along the route the steel travels and instantly feeds the information into the computer.

2. The computer also accepts information (from punched tape) on the number of slabs called for in the mill's production schedule and characteristics and specifications of the product to be rolled.

• **Rolling Control**—Working continuously with that information at the rate of 44,000 computations per minute, the computer will automatically control temperatures and tighten or loosen screwdown rollers or width controls. At the same time, the system will record detailed information on each slab and sound an alarm if any part of it begins to fall off preset standards.

The steel strike delayed the construction schedule of the $90 million to $100 million mill, Great Lakes Steel officials report. It's being built at GLS's River Rouge, Mich., location and completion is expected in the last half of 1961.

Mill equipment will include five roughing stands and seven finishing stands. The finishing train will have 54,000 hp, providing a maximum finishing speed of 3000 ft per minute. Slabs up to 30 ft long, 75 in. wide, and 9 in. thick can be handled, and the mill will be able to turn out 35 ton coils, 72 in. in diameter.

The new GLS facility is part of National Steel Corp.'s $300 million expansion program that's due to be completed by 1962.

Computers Hurry Up Patent Searching

STREAMLINED patent searching with electronic computers, under development at the U. S. Patent Office, may soon turn an all-day research chore into a half hour job.

The new system relies on rapid calculation by a general purpose electronic computer that can process data cards turned out by a punched card machine. Patent Commissioner Robert C. Watson says the new system is being tested on a mass of patent data covering chemical compounds that form the basis for many commonly used plastics.

The chemical polymer group was picked for testing because it is "one of the broadest and toughest fields in patent research."

A government-industry research team, formed by the Patent Office and the Research Div., Textile Fibers Dept., E. I. du Pont de Nemours & Co. Inc., adapted the agency's punched card file to commercially available data processing equipment. A Bendix G-15 digital computer, manufactured by the Computer Div., Bendix Aviation Corp., was used successfully to search for patent information by a serial scanning technique.

In addition to its speed, the computer can also do a better searching job by looking up alternatives for materials or processes. While searching for specific patents, it can identify areas of invention or discovery that may have been overlooked.

The Patent Office, currently issuing more than 1000 patents a week, will also record complete patent files on magnetic tape for sale to private researchers.

Metal Finishing:

Package Deals Coming?

Suppliers Study Service Extension

SOMEDAY you may be able to sign a contract with a supplier to furnish all your metal finishing needs—materials, equipment, even personnel. You'll pay him on a "per finished part" basis.

That's quite a switch from today's practice of buying your chemicals for cleaning from one supplier, buying phosphating agents from another, buying finishing materials from a third, and buying machinery from an equipment builder.

Several companies are investigating the new concept.

Glidden Co. is considering a trial program with some smaller firms, says George S. Forbes, general manager of industrial sales.

F. P. Spruance Jr., vice president of the Metalworking Chemicals Div., Amchem Products Inc., reveals: "We have considered it from time to time but never put it in operation. We have on three or four occasions guaranteed the customer a cost per unit area or by the unit."

Last year Du Pont announced the development of its complete finishing system which uses trichlorethylene based cleaning material, phosphating agent, and paints. Says J. J. Hargarten, service manager of Du Pont's Chlorine Products Div.: "This move was made possible by research work aimed at expanding the uses of a product."

Extension of the product line enables a salesman to offer a complete product service, and it emphasizes the advantages of buying a series of his company's products. (They are tailored to produce optimum results when used together.)

But the biggest advantage of the approach accrues to the customer. He has to deal with only one supplier rather than several. He can pinpoint responsibility for results of the finishing operation. He also gets more complete technical help.

• Service benefits could be a big plus for the customer.

Pennsalt Chemicals Corp., which used to offer only cleaning and phosphating chemicals for metal finishing, now designs and sells the equipment to use those materials. That expansion into the equipment end of the business has taken place because the firm feels it can offer more service than most equipment builders do.

"Service is the greatest asset we can offer a customer," explains a company spokesman. "We make regular service calls for materials every month or six weeks and could easily make adjustments to equipment at that time," he adds.

Pennsalt normally supplies integrated equipment for precleaning, cleaning and activating, phosphating, and rinsing and sealing metal products. The firm indicates it would be interested in supplying equipment for a complete finishing line, but it doesn't want to get into the paint business.

• Many problems will have to be solved before the concept gets full approval.

Citing disadvantages to the supplier, Mr. Spruance of Metalworking Chemicals states: "We must accept the customer's production count, and then the question as to who was responsible for rejects must always be raised."

In that type of operation, the customer can do little in reducing the cost per item. He would have to rely on the supplier to give him the advantage of improvements in processes and production techniques.

Mr. Spruance continues: "We prefer to operate as we have in the past. We install a process in a customer's plant, teach him how to run the process, check him periodically to make sure he is following our directions, and allow the customer the freedom of operating the process as efficiently as he can."

Du Pont's Mr. Hargarten feels that such a concept is a drastic extension of activities that falls outside the area in which his division can or should logically function.

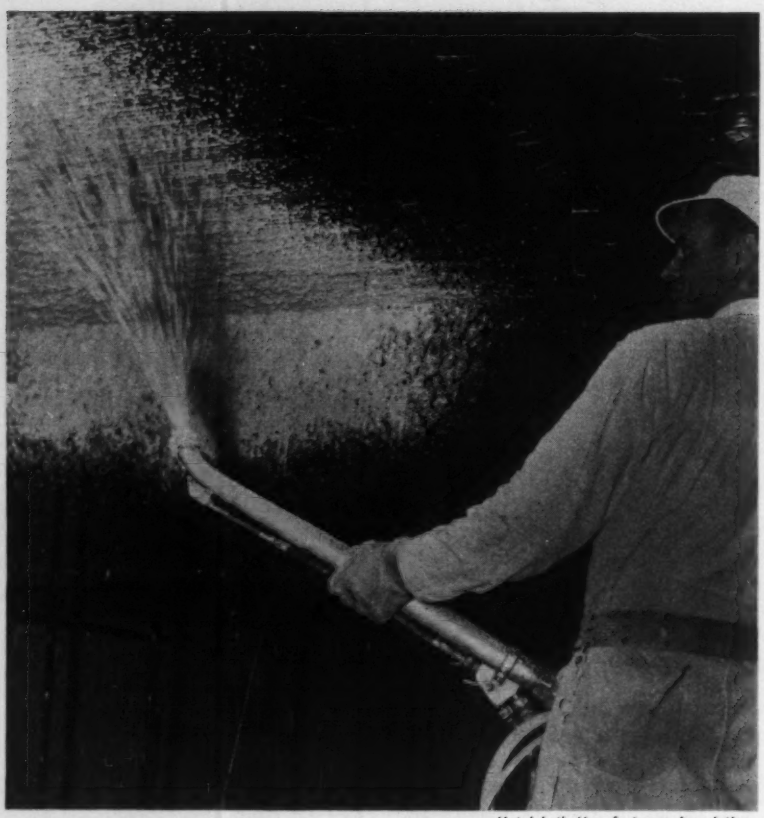
Despite such objections, Mr. Hargarten adds: "It appears that there is a definite demand by metal fabricators for suppliers who can assume responsibility for design, fabrication, and installation of complete finishing systems."

Latin Ore Being Barged To Inland Steel Furnaces

Inland Steel Co. is getting its first iron ore from South America. Some 200,000 tons, acquired from Peru and Chile, are being barged from New Orleans to Chicago via the Mississippi and Illinois Rivers.

The ore is being used to assure Inland of adequate stocks for its near-capacity operations. Another 400,000 tons of Canadian ore have also been added to its winter stockpile.

Officials report that the cost of the South American ore, when iron content is considered, is comparable to that of ore received from the Duluth-Superior harbor.



Metal Lath Manufacturers Association.

The base coat of plaster is mechanically applied to a metal lath ceiling

Construction Boom to Bolster Lath Upturn

METAL LATH manufacturers are targeting a 10 to 15 per cent sales increase for 1960. Last year's sales approached $30 million.

The basis for optimism is "continued large scale industrial, commercial, and educational building," observes Penn Metal Co. Inc., Boston. Industrial building will bounce up 25 per cent this year and overall construction, despite a decline in housing starts, is headed for a record $55 billion to $56 billion. As a result, "we anticipate a 10 per cent increase in sales," says Inland Steel Products Co., Milwaukee, one of more than a dozen U. S. lathmakers.

Despite 1960's cheery prospects, shipments won't equal those of the postwar boom. In 1947, 86 million sq yd of metal lath were sold. It's primarily used as a plaster base. As the boom eased and stiff competition from such alternative materials as drywall plaster and acoustical ceilings rose, lath demand dropped. However, shipments have gradually increased over the last few years and about 71 million sq yd were sold in 1959.

• **Sales Points**—"Plaster and (metal) lath offer fire and corrosion resistance, strength, and durability," emphasizes U. S. Gypsum Co., Chicago. "Lath can be formed into many shapes to meet design requirements," adds Ceco Steel Products Co., Chicago. A variety of surface textures can also be achieved.

An industry official reports use of metal lath permits narrow walls, saving up to 5 per cent on floor space over conventional wall construction methods. Lath is popular in building remodeling and for making soundproof movable partitions. Decoration, grilles, and filters are among its many other uses.

• **Sales Boosters**—"Sales will be aided by the increased acceptance of plaster guns," states Alabama Metal Lath Co., Birmingham. Improved acoustical plaster and renewed interest in lime stucco exteriors should also brighten the sales picture, relates an industry spokesman. Houses with load bearing metal lath panel walls have been built in some parts of the South and California.

• **Sales Problems** — Although there has been some price cutting, the industry believes its pricing situation is relatively stable. Prices may rise when steel prices are boosted, creating some competitive disadvantages, believes a sales manager.

One firm reports a shortage of plasterers and mechanics to erect metal lath. The company also bemoans the high wage rates and low productivity of both labor groups.

• **Stocks Satisfactory** — Inventories are down from the same period last year because of steel shortages. But they appear adequate to meet present demand. Soule Steel Co., San Francisco, notes some problems with the availability of special sizes.

Business Employs 66% of Scientists and Engineers

About 780,000 scientists and engineers are in U. S. business firms; another 390,000 are in government, education, and nonprofit organizations, or are self-employed. About 35 per cent of those in industry are in research and development functions, says the National Science Foundation.

Three industries—aircraft and parts, electrical equipment, and chemicals and allied products—employ 75,000 or more each. Two—nonelectrical machinery and engineering and architectural services—employ 50,000 or more. Employing more than 30,000 are construction, fabricated metal products, primary metals, motor vehicles and equipment.

In Foreign Markets . . .

Resources & Facilities Corp. Helps U. S. Clients

- Develop supply sources.
- Promote specific products.
- Analyze markets.
- Report marketing facts, trends.
- Formulate marketing campaigns.
- Study application problems.
- Exchange technical information.
- Operate trade fair exhibits.
- Establish licensees.
- Police contracts.

Refac Sells World Markets

U. S. MANUFACTURERS are turning increasingly to "inside out" international marketing to snare more overseas business. Licensing and technical assistance agreements between U. S. and foreign producers are putting more American products inside foreign markets, reports Resources & Facilities Corp. (Refac), New York.

Refac, established in 1953, makes its living, and royalty profits for its U. S. clients, by hooking up domestic products and technical knowhow with foreign production facilities. Eugene M. Lang, president of Refac, says his multilingual, world-wide staff of technical and professional personnel keeps in personal touch with licensed manufacturers from 11 permanent foreign offices.

"The close contact which Refac maintains with clients and licensees, and the world-wide interchange of engineering and commercial data that Refac performs, give each license relationship a dynamic quality," he points out. "Moreover," he adds, "this is done with little cost to Refac's client, or diversion of his capital or executive talent."

• **Marketing Knowhow**—To acquire licensed outlets, the U. S. company grants Refac the right to license its product or process abroad and provides related technical knowhow. Refac then sets up suitable licensees in appropriate foreign markets, on terms subject to client approval, and continues to administer and service the license. Its work is done at its own expense and risk, and it is compensated with a share of the license income produced.

One of Refac's clients is Heli-Coil Corp., Danbury, Conn. Since acquiring licensing rights in 1953, Refac has established Heli-Coil screw thread fastener licensees in Australia, England, France, Germany, and Japan. The patented fasteners are now specified end product components in thousands of European and Asian factories, promoted by Refac's integrated marketing program. In addition, says Mr. Lang, the licensing arrangement has returned more than just substantial royalty income; it "has produced a valuable body of application engineering which the Danbury company has found useful in its U. S. sales. Moreover, research and development projects of licensees have contributed notably to Heli-Coil product technology." (Some other U. S. products licensed by Refac: Ultrasonic equipment and hydraulic controls of Sperry Products Inc., diaphragm seals of Bellofram Corp., and the Endurion rustproofing process of J. N. Tuttle Inc.)

• **Wide Marketing Range**—Refac's circle of license relationships now includes more than 200 companies in 20 countries, ranging from industrially sophisticated areas like Europe and Japan and growth areas like Australia and Brazil to more primitive areas like Indonesia and the Philippines.

As a service arm of its licensing management, Refac's Foreign Trade Div. handles export sales for its U. S. clients. It also undertakes specialized procurement of parts and materials to desired standards of quality.

How's Your Economic IQ?

A survey of 3500 supervisors and employees finds that 87 per cent have no clear idea of what kind of government the Constitution sets up; 79 per cent don't know that the Supreme Court is independent in our Constitutional system; 55 per cent do not know how federal laws are passed; 49 per cent don't know why a balanced budget is important.

That survey, says H. C. Lumb, vice president, Republic Steel Corp., points up one of the great problems facing the American people today—political indifference and political ignorance. Adds W. F. Rockwell Jr., president, Rockwell Mfg. Co.: More than 50 per cent of high school students think higher wages or lower prices—without increased productivity—will raise the standard of living; 43 per cent believe the government could control prices.

Because of those damaging misconceptions, held by most adults as well as high school students, labor leaders have been able to convince the public that: 1. Wage boosts can exceed productivity without creating inflation. 2. Efforts to eliminate featherbedding should not be tolerated. 3. Unions should be exempt from laws prohibiting violence and destruction of property. 4. Profits are viewed with suspicion.

Two things must be done to solve the problem, says Mr. Rockwell: 1. Businessmen, at all levels, must develop better public understanding and support for sound economic policies. 2. We must place the subject of economics on the general public level—teach it in the eighth or ninth grade, demand that college students take at least one year of it, require high school teachers to have a better background in it.

Inquiries into Small Business Problems . . . Overseas Income Tax Deferral . . . Survey of Steel's Labor Relations Coming

Senate Small Business Committee Puts These Topics Up for Study

- **Impact on Small Business of Prolonged Strikes in Basic Industries**
- **Taxes and Depreciation**
- **Foreign Trade and Small Business**
- **Government Procurement**
- **Burden of Government Paperwork on Small Business**

TOPICS OF INTEREST to the Senate Small Business Committee this year reflect the influence of the steel strike, foreign competition, and concern over the small share of government business going to small firms.

The items in the checklist above are but five of the 30 subjects the committee headed by Sen. John Sparkman (D., Ala.) has scheduled for study in this session.

The practice of a few small firms to form pools, cooperatives, and joint ventures to compete for government business is due for some attention by the committee. The inquiry will be aimed at finding out: 1. The success of the approach. 2. How more firms can be encouraged to use it.

FHA Gives Aluminum Big Push

The Federal Housing Administration will grant larger insured mortgages on homes utilizing aluminum or other low-maintenance materials. It is a new policy reflecting field observations over the last few years. Reynolds Metals Co. says a saving of $5 a month in maintenance costs may increase the amount of the FHA insured mortgage by $800. Reynolds' aluminum clad House of Ease, which was introduced last year, is supposed to save the homeowner about $10 a month in repainting, repairs, maintenance, heating and air conditioning costs.

Boggs Bill Moves Toward Approval

H.R. 5, which calls for deferral of taxes on income earned overseas, is moving toward approval by the House. The Ways & Means Committee has O.K.'d provisions calling for the creation of foreign business corporations through which U. S. firms will conduct their foreign operations. Tax deferral will not just be limited to the less developed countries if Ways & Means has its way. President Eisenhower requested that limitation in his budget message.

Saturn Program Boosted

Add $113 million to the fiscal 1961 budget for the National Aeronautics & Space Administration, and we will have a space vehicle with 1.5 million lb of thrust by 1963-64, says the President. He asks that the money be mostly spent on the Saturn program, the big booster transferred from the Army to NASA last year. About $15 million of the additional funds will be spent on NOVA, the F-1 engine project, which is thought to be a more efficient booster than Saturn but will come a couple of years later. Ike also is asking Congress for another $23 million for the fiscal 1960 budget. Those requests will probably shut off attempts of some congressmen to push the NASA program past the $1 billion mark. The additional funds Ike asks for bring the total to $915 million for the next fiscal year and $530 million for this fiscal year.

'Hot Metal' Contracts Up for Study

The House Small Business Committee is readying some studies of its own. Among those under consideration: A look at aluminum "hot metal" contracts. (Reynolds Metals Co. and Aluminum Co. of America are supplying the light metal in molten form to Ford Motor Co. and General Motors Corp. plants.) Diecasters have registered complaints.

If called to Capitol Hill, the aluminum producers are certain to point out that molten aluminum is a fourth basic product. The other three: Pig, ingot, and billet.

Mitchell to Look at Steel Strike Causes

Labor Secretary James Mitchell has appointed a high level group of university professors to study the industrial relations of the steel industry. Prof. E. Robert Livernash, Harvard University Graduate School of Business Administration, will direct it. The study will include the effects of the steel strike on the economy as a whole and the effect of the settlement on national level of wages, costs, and prices.

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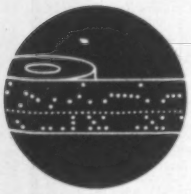

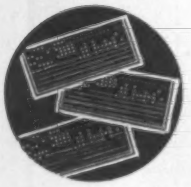

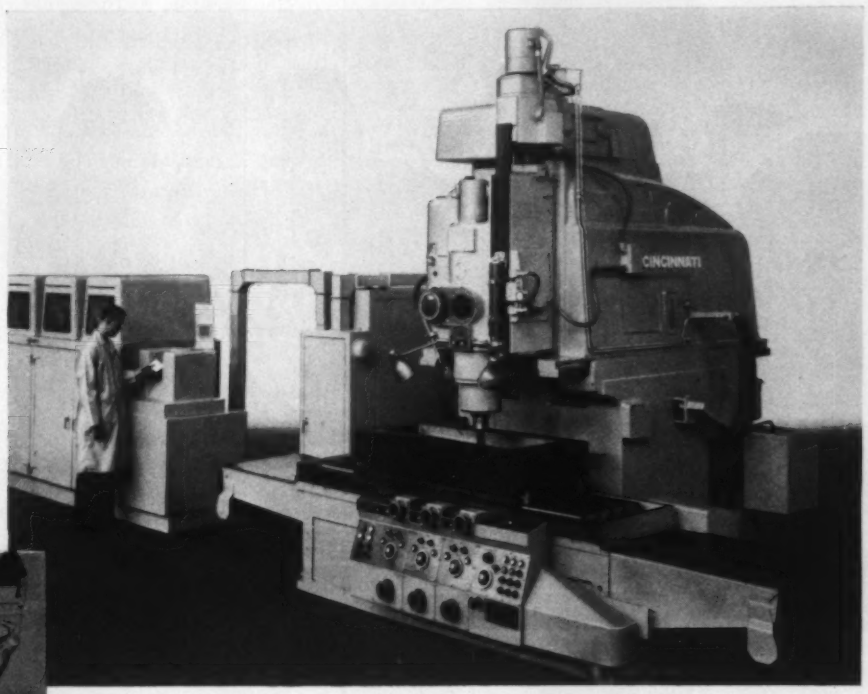

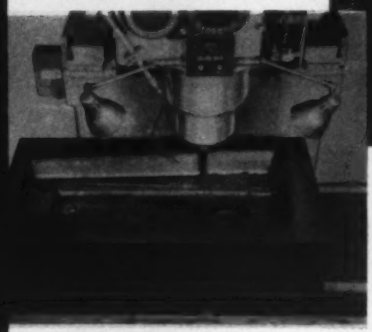

CINCINNATI 30" x 52" Vertical Hydro-Tel equipped with CINCINNATI ACRAMATIC 3-Axis contour control, performing a die sinking operation on a die for a milling machine motor compartment cover. ACRAMATIC's exclusive parabolic interpolation method programmed this entire complex operation using only 2000 punched cards for the twenty hours of machining required.

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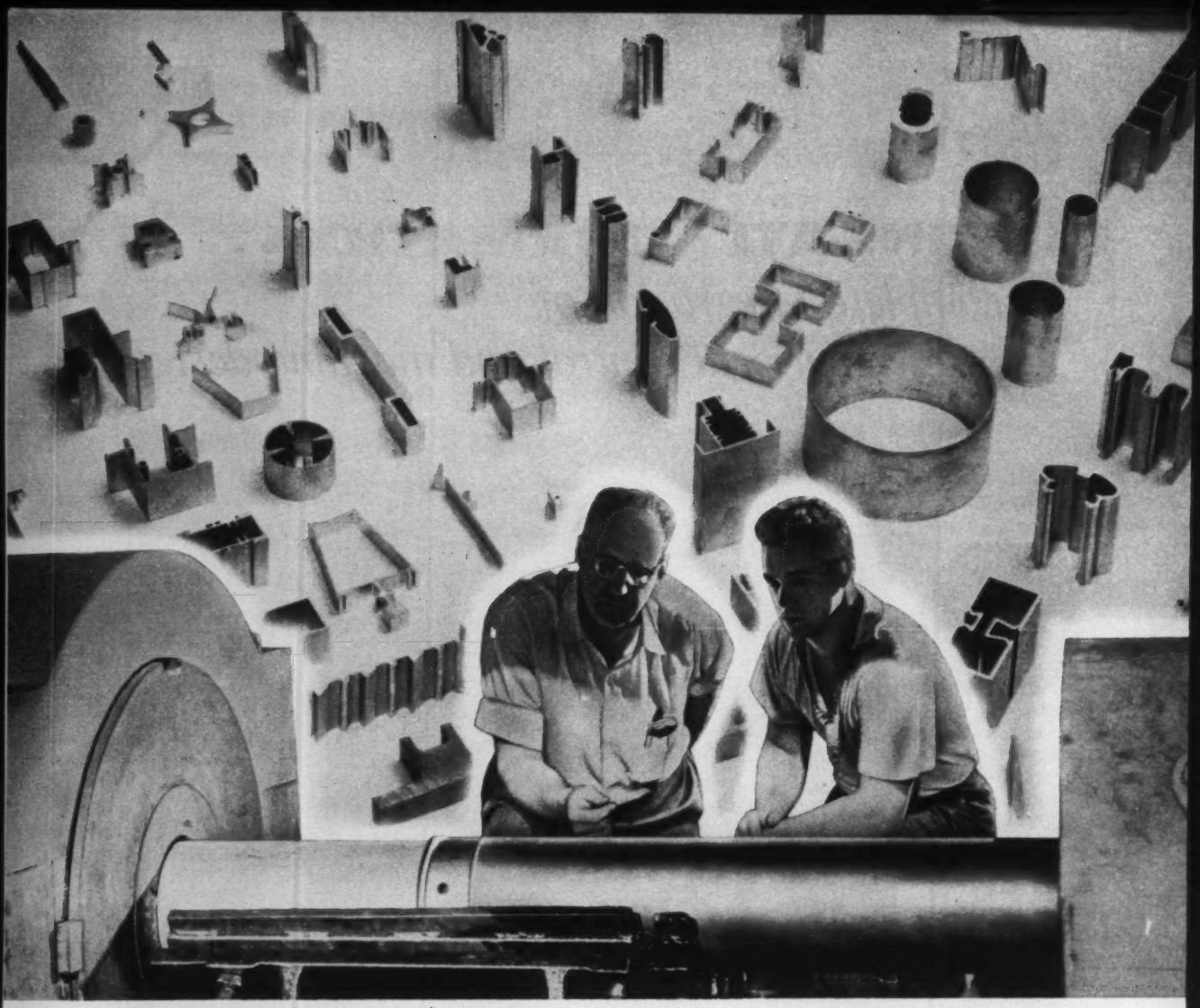

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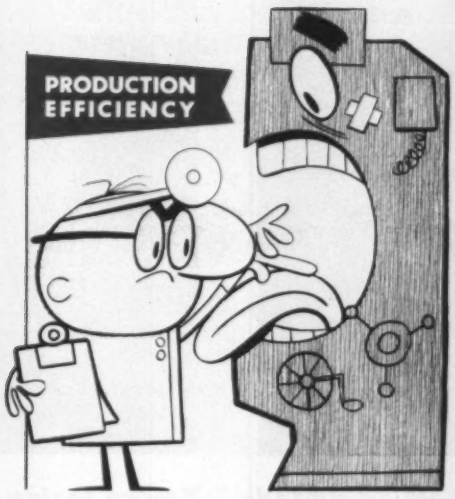


How to Diagnose Your Equipment Needs

A HORRIBLE MALADY is crippling metalworking. It's called entropy. Definition:

> **En-tro-py,** *n.*, (From Greek *trope*). A measure of unavailable energy. The tendency to run down, become obsolete, stagnate. The prime roadblock to production efficiency. *Synonym (as used here)*: Industrial cancer.

• You may have it.

The five most common symptoms are pictured on the next pages. If any of them look familiar, walk out into your shop. See any machines more than 20 years old? See many more than ten years old? If so, rush to your cost accounting department. Have unit manufacturing costs been rising steadily? If they have, your suspicions have been confirmed. You have entropy!

• You're not alone.

The majority of metalworking is afflicted. In an exhaustive search, STEEL's editors could find only a handful of plants that had immunized themselves against this cancer of industry. They did it by establishing—and using—sound, systematic programs for equipment replacement.

• It can be fatal.

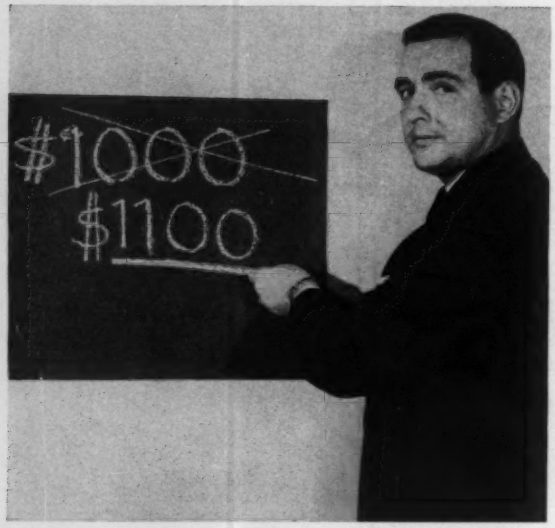
The editors found advanced cases of entropy everywhere. A New England component maker lost nearly 30 per cent of its market to foreign manufacturers who had built efficient, new plants after World War II. A Midwestern stamping plant failed to show a profit on one of the biggest contracts it had ever won. Reason: Its archaic equipment wouldn't stand up under three-shift operations. For an Ohio foundry, entropy proved fatal. May it rest in peace—as its equipment should have years ago.

Those three companies — and countless others—can trace their catastrophes to a common industrial ailment: Failure to keep production facilities up to date. So spiraling unit costs rendered them noncompetitive.

• Take advantage of your competitors' infirmities.

Because failure to keep facilities modern is common in the U. S. today, America is losing its industrial supremacy. But alert managers are making this commonness work to their advantage. By developing sound replacement programs, they gain a whopping competitive edge. For example, Standard Pressed Steel Co., Jenkintown, Pa., doubles its sales volume every five years—in the fastener industry where foreign competition is severe and price fighting is common. SPS attributes much of its success to a dynamic equipment replacement policy. The average age of its production machines is less than five years. It plows back around 80 per cent of

Five Danger Signals of Industrial



Your only means of offsetting added costs is to boost your prices

You're losing customers to competitive materials

its yearly profits into new facilities.

Says H. Thomas Hallowell Jr., SPS president: "More and better products at lower cost is the challenge industry faces. Plant management's answer to the challenge must be increased productivity — more goods per unit of time, per unit of floor space, per unit of material, light, heat, and power. You'll find that answer only by well planned investment in better plants, equipment, and working conditions."

- **Planning is your best precaution.**

You can meet that challenge with a sound equipment replacement program designed to: 1. Find the need for new equipment at the optimum time. 2. Find the most efficient replacement. 3. Put it into production at the least cost with the greatest potential savings.

- **Know where to look for entropy's symptoms.**

You can find the need for new equipment in numerous ways. The key is knowing what to look for and where.

- **Check unit production costs.**

That is probably your most fruitful hunting ground. Alert managers know exactly how much it costs to produce each product that leaves their plants. And they know how much of that cost was added at each stage of the item's production. So bring your accounting and production engineering people into the replacement act. When production costs increase at any point, find out why immediately. Cost information is available in many plants, but few watch it close enough—and even fewer act upon the findings.

- **Watch maintenance expenses.**

Two months ago, an Ohio sheet metal fabricator had to place a rush order for a new press. The base casting cracked on the old one. Result: The firm had to shift production to machines not well fitted for the work. And it is shelling out overtime pay to meet delivery schedules—until the new press can be put into operation.

The saddest part of the story: The situation could have been avoided. The firm's chief production engineer checked the maintenance records for the old press and found that the condition which caused the failure became noticeable months before the breakdown. Had a new press been ordered then, little production time would have been lost. Perhaps the old press could have been rebuilt. Instead, its salvage value had to be figured by a scrap dealer.

F. M. Bender, vice president-manufacturing, Miehle Co., a division of Miehle-Goss-Dexter Inc., Chicago, points out that maintenance costs alone will seldom justify a replacement in a plant with modern facilities. But in not-so-modern plants, that should be a prime area for scrutiny. In modern plants, rising maintenance costs warn you to investigate a machine's efficiency.

Timken Roller Bearing Co., Canton, Ohio, sets a maintenance par for each machine and keeps a card file record. When a machine fails to stay under par, the card is pulled and the machine is analyzed.

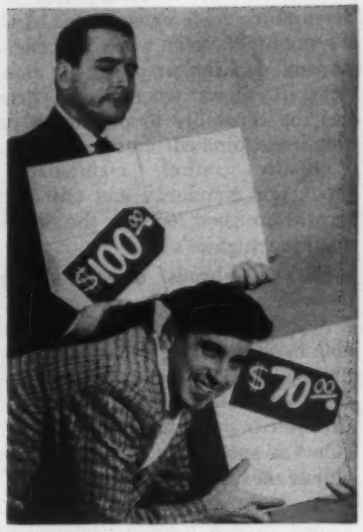
- **Look into bottlenecks and delivery delays.**

Such conditions often signal the need for new equipment. Example: An Eastern partmaker experienced a marked delay at a final finishing operation. The first—and easiest—solution was to add a third shift

Cancer

You're caught in a price fight

Your profits fail to rise while sales are high



You're losing markets to foreign competitors

on this job. Then management found a new machine that would handle the load. But an alert industrial engineer came up with an even better solution: The finishing operation was eliminated by replacing a machine back down the line with a new machine that would make the part to the desired standard in one operation.

• Idle time is a tipoff.

When a machine in a line is running at far less than its capacity, chances are you'll find inefficiency in the operations preceding it.

• Investigate rising reject rates.

Miniaturization, automation, greater reliability, and faster assembly all call for closer tolerances and better finishes. But the buyer wants those features at little added cost. Result: You can't afford to operate erratic equipment.

Says Mr. Bender: "The requirement for accuracy is getting more and more important. This alone sometimes dictates a decision to invest in new equipment."

Caterpillar Tractor Co. ranks replacement possibilities according to the rate of return each new piece of equipment will deliver. But quality considerations will push a low ranking proposal up into a top priority spot.

Watch your scrap generation. Alone, it will seldom justify replacement, but with other factors, it can tip the scales.

• Old age lowers your resistance.

Machines, like people, have a tough time hitting peak productivity when they grow older. But machines are at an added disadvantage: 1960 model people are built pretty much like their 1930 counterparts; not so with machines. For example, Ingersoll Milling Machine Co. had 287 machine tools in its plant in the late 1920s. Today, it has 181. But those 181 have three times as much real capacity as did the 287. Moral: He who operates many old machines may be his competitor's best ally.

The progressive equipment users with whom STEEL talked advise you to analyze every piece of equipment when it reaches a specified age—or at scheduled intervals. Objective: Make the machine justify its existence in your shop.

Miehle Co. makes an annual survey of every production machine in its plant. The works manager, superintendent of production, manufacturing engineer, and foremen examine maintenance records, production rates, and accuracy. They compare performance with what could be expected of a new machine. If there is a significant gap, a replacement is considered.

D. U. Kudlich, equipment replacement expert at Food Machinery & Chemical Corp., San Jose, Calif., has adopted this policy: When a machine is considered for replacement, like machines of the same age are analyzed.

• You can diagnose your own case . . .

Your own people are the best experts you can hire to detect entropy. But they must know the approaches to use and have the instruments to do the probing.

—If you keep records.

One of the most important tools is a good set of records. Victory Metal Mfg. Corp., Philadelphia, maintains a file on each piece of equipment. Included: Description of the equipment, make, model, serial number, date purchased, vend-

er, cost, any special features and their cost, name of serviceman, capacity, spare parts carried, maintenance, service record, and other information. It's a handy tool in determining replacement needs. And it's mighty helpful when the engineering department designs a new item. It shows whether the firm has the capability to produce it or whether equipment must be bought.

Quality control, maintenance, production standards, and unit cost records are good tools for the equipment investigator's kit.

—If you always question your methods.

Many managers find it's profitable to walk through the shop questioning methods of operation. Can some operations be eliminated? Combined? Simplified? Speeded? (One executive told STEEL his firm almost always operates its equipment faster than builders specify. "They have a terrible tendency to underestimate their equipment's capabilities," he asserts.)

—If you know what is available.

Most equipment is obsolete long before it wears out—due to availability of a more efficient replacement. "Knowledge of the newest developments in machine tools is a prerequisite to making ideas pay off," declares SPS's Mr. Hallowell. Food Machinery & Chemical Corp.'s Canning Machine Div., Hoopeston, Ill., bought ten new Warner & Swasey machines to replace 14 old turret lathes—obsoleted because 80 per cent of the firm's products had been developed since it bought the old machines.

"We're always on the lookout for equipment with new features or machines that operate on a new concept," says Miehle's Mr. Bender, whose firm is putting numerically controlled machines to work in numerous applications. Being alert for the unusual often pays off. For example, SPS doubled the output of its fork lift trucks by investing in two way radio control.

Your best sources for new equipment ideas include: 1. Business publications. (More than 2000 new products are announced in STEEL each year.) 2. Trade shows. (Now is the time to get set to cover The Machine Tool Exposition—1960, in Chicago, Sept. 6-16.) 3. Plant visits. (Example: W. J. Artner, plant manager, National Machinery Co., Tiffin, Ohio, regularly takes his foremen to other plants to pick up new ideas.) 4. Equipment makers. 5. Your suppliers. 6. Customers. 7. Trips abroad. (The president of a fastener firm is going to Germany this spring to investigate a machine that could reportedly cut his production costs 10 per cent on his highest volume item.) 8. Salesmen.

—If you employ good guides.

Formulas, like MAPI's famous one, can be excellent guideposts in your search for production efficiency. Miehle Co., and many other firms, almost always use the MAPI formula to determine the cost savings potential of a new machine. But you can't make a rigid rule to replace only when the formula shows you should, contends Mr. Bender. "We have often made replacements, with good results, where the formula alone did not justify them," he adds.

Some companies have outstanding replacement programs without formulas. National Machinery seldom uses one. It relies on judgment—but considers all of the factors that a formula takes into account. It's largely a matter of experience. "Our using a formula would be like using a road map to drive from Tiffin to Findlay (25 miles away) when you've lived in Tiffin all your life," says Mr. Artner.

—If you forecast your needs.

The authorities STEEL interviewed were unanimous in proclaiming the advantages of equipment forecasts.

Each September, Miehle Co. prepares a detailed equipment budget for the ensuing year. The budget is developed by the vice president-manufacturing, the works manager, the superintendent of manufacture, the chief industrial engineer, the manufacturing engineer, the two general foremen, and the nine production department foremen. They list each machine to be purchased, its cost, the machines to be replaced, and the reason for each new purchase. The budget then becomes the focal point of equipment replacement activity. It facilitates establishment of purchase priorities, delivery scheduling, and integration into production. The budget is not slavishly followed; substitutions and additions can be made at any time.

Standard Pressed Steel Co. forecasts annual equipment needs for a five year period and makes rough estimates as far as ten years ahead.

Timken establishes a tentative five year equipment budget for each department, reviews it annually. Each operating superintendent lists the equipment he wants over the coming three years—and tells why he wants it.

Caterpillar forecasts equipment needs a year at a time by quarters. If a project will be of more than one year duration, projection is on an annual basis after the first year.

• Prescription for Profits—Knowing how to spot the need for new equipment puts you on the threshold to recovery from entropy. But regaining robust health requires much additional planning—and action. STEEL will delve into the other ingredients of a good replacement program in succeeding articles in this series. Two necessary elements of your program: 1. A master plan—statement of objectives and listing of steps you'll take to reach them. 2. Courage—enough confidence in your future to follow your plan during bad business times as well as good. Ingersoll, for example, invested $700,000 in new equipment in 1958 when its shipments were running at less than two-thirds of capacity.

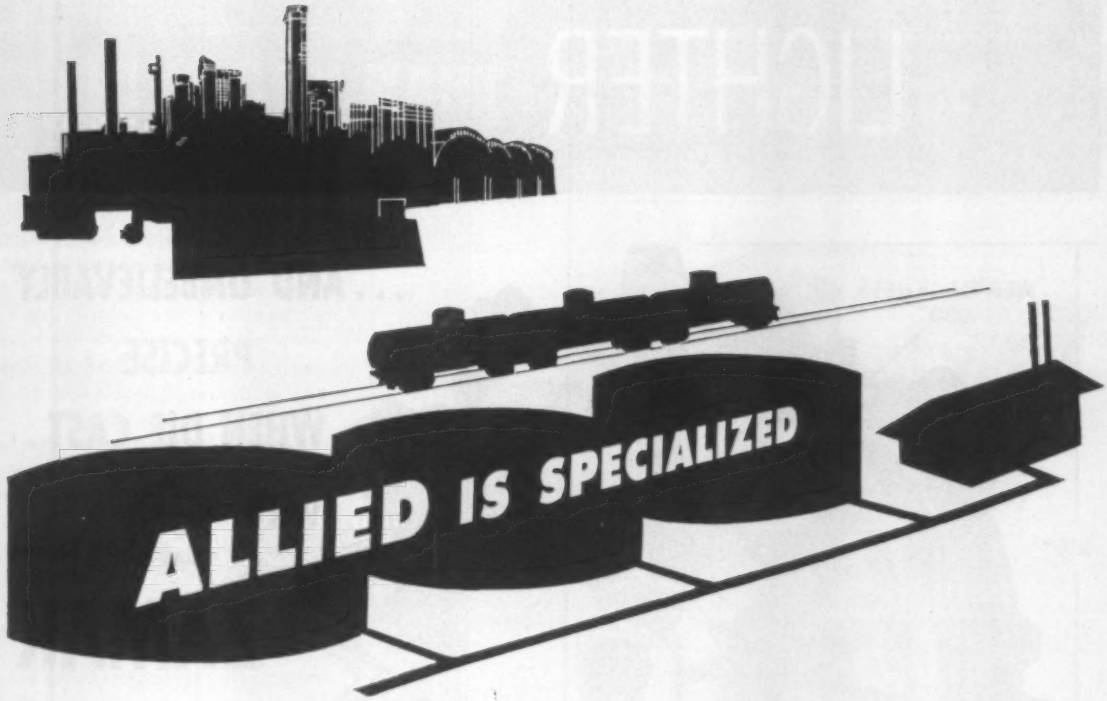
• You must initiate the cure.

The fight against entropy requires top management's continued interest and enthusiastic support; it needs middle management's resourcefulness; it should glean ideas from supervisory and production people; it must start with you. Says Mr. Hallowell: "Middle management must make top management aware that profits wisely spent within the plant will be the key to greater output, lower costs."

Production Efficiency

How to Organize for It

That's the subject of the fourth article in this series. It will appear on these pages Feb. 22. For a free copy of each of the 13 articles in this Program for Management, write: Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.



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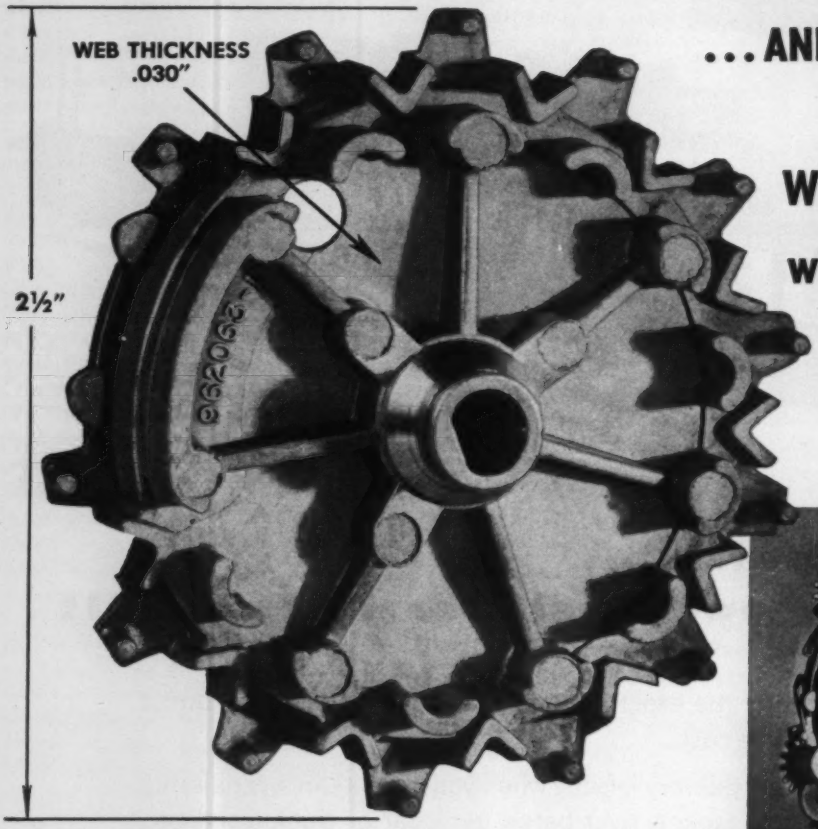

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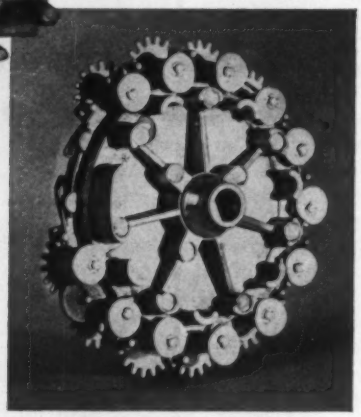

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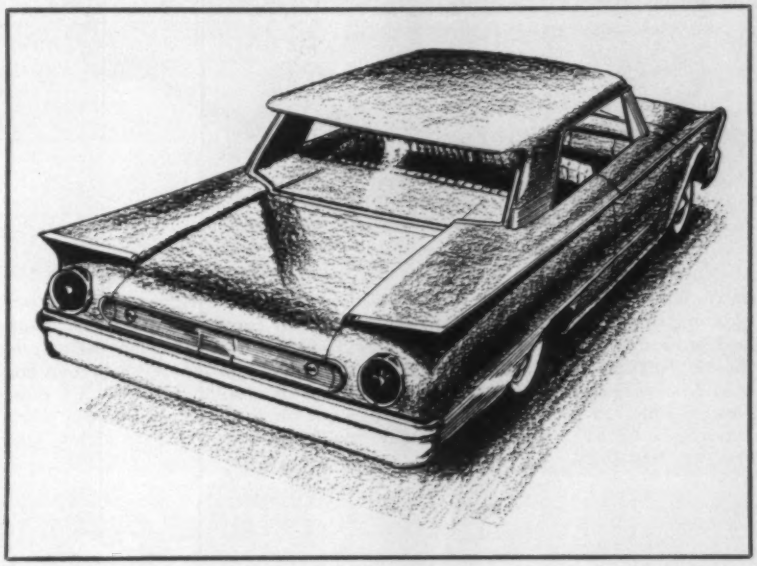
Motordom Plans Face Lifts for 1961

FACE LIFTS: That's the word for Detroit's 1961 models. Design engineers say there's little point in making full body shell changes when unitized bodies are scheduled to appear in the next two or three years. As STEEL has indicated previously, the transaxle programs have been delayed again. Carbuilders will turn to more diecast dashboards in several different metals for next year's cars.



Verbal descriptions give STEEL's artists this impression of the 1961 Ford

• **General Motors**—As far as can be learned, all GM lines will have front and rear quarter panel changes. They'll also have new grilles. Buick plans a new frame for its LeSabre line. It's also reported that another one of the GM divisions is returning to a zinc diecast grille. For intricate grille designs, zinc apparently offers a slight cost advantage over aluminum.

Suppliers have been saying for some time that GM is returning to its ABC body system next year. The single body shell with extensions which it adopted in 1959 is not versatile enough to handle all the different lines of cars. By returning to the three body method, the corporation will still be able to use many inner body panels interchangeably, but it will gain more interior space in its larger cars. The smaller B-O-P compact cars will be sharing a separate shell adapted from Chevrolet's Corvair.

Initially, GM had pushed for the single body shell concept because it was felt that sizable cost savings could be gained via the standardization of parts. As a result, the the company could plan on annual face lifts to freshen up each year's cars.

But standardization of a body and frame design hasn't paid off, say engineers. Result: GM will try again when it moves into semiunitized bodies with stub frame extensions on the front. That is the Chrysler approach. It's a natural for GM too because each car division is responsible for building body components ahead of the firewall. Fisher Body Div. builds the rest of the body. Apparently, the move means bolt-on fenders and major styling emphasis on front ends.

• **Ford Motor Co.** — Sheet metal changes will be extensive on 1961 Ford lines. Reported to be the biggest change appearancewise: The Ford car will have the crisper look of its successful 1957 models. Industry talk claims that front fenders will again be squared off. The fins (or blades, as Ford calls them) are being recanted more along Comet or Lincoln lines. A simple, clean lined, horizontal front grille is programed. Ford will also introduce a rear grille treatment. Taillights will return to the round bull's-eye look which the company believes is a useful trademark. There's talk that the hardtop convertible, dropped this year, will be revived for 1961. It may return earlier.

Mercury will be built on the Ford chassis and have revamped quarters and front fenders. Competitive stylists say the basic approach will remain the same. Thunderbirds will supposedly switch to a stub frame unit body in '61. The Lincoln Premiere line will reportedly be dropped, and the luxury car will be restyled along T-Bird lines. It may be slightly smaller. Reports are that it's at least 2 in. lower than this year's car.

• **Chrysler Corp.**—Plymouth is getting the most attention for 1961, but the other corporation lines will have new sheet metal too. Chrysler believes the "face" of a car is one of the areas where change is most appreciated, so grilles and front fenders are getting the full treatment. Plymouth's tailfin is being sliced off. Look for the flatter Chevrolet type of rear quarter treatment, more in line with Valiant styling. Plymouth is also returning to chrome. The styling department is currently scheduling a rocket type

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ONLY SEVEN BASIC MOVING PARTS are a highlight of the three cylinder, two cycle engines powering this line of Auto Union-DKW cars being imported through Studebaker-Packard Corp.'s sales subsidiary, Mercedes-Benz Sales Inc., New York. The AU 1000 SP sports coupe shown above is 51 in. high, 164 in. long, and has a 92.5 in. wheelbase. The engine has 59.8 cu in. displacement and 8:1 compression ratio. It uses a mixture of oil and gas for fuel. Top speed is 87 mph. It develops 62 hp. Prices of the entire line range from $1995 to $2526, port of entry, New York

aluminum trim spear that extends from the front of the car to the taillights.

• **The Profitmakers**—American Motors Corp. and Studebaker-Packard Corp. are committed to present styling treatments because of their marketing approach. AMC, however, is supposed to increase the wheelbase on both the 100 in. and 108 in. Ramblers. The smaller American is slated for a 104 in. wheelbase. The larger cars will be built on a 112 in. wheelbase. Information is sketchy, but the British built Metropolitan reportedly is being stretched too. The revisions will help AMC compete with imports. It also gives the firm a chance to extend its Ambassador series into a luxury vehicle that could be more competitive with Chryslers and Cadillacs. The question: Will the approach violate or endanger the compact car philosophy preached by George Romney, AMC's president?

• **Tiny Cars Coming**—Even while the car companies are readying a higher priced group of compact cars for production, their design and engineering groups also are preparing smaller vehicles. The feeling is strong that import sales won't shrink and that the industry may have to put cars on the market that will compete directly with the smaller foreign jobs.

Ford's smaller car project is reportedly called Sigma III. It's in the 1650 lb category and will have a wheelbase of nearly 100 in. Although several drive trains have been laid out, it now looks like the Sigma III will be powered by a V4 engine and have front wheel drive.

GM and Chrysler are silent about their small car programs, but it's understood the GM job is considering a 94 in. wheelbase. Chrysler has a similar design underway, but its efforts are now aimed at preparing a car to compete with the Comet and the larger B-O-P compacts. Wheelbase is reported to be 109 in. Tentatively, the company is considering Lancer as a name for its second compact. Introduction could be during the 1961 model year.

Transaxles Pushed for 1962

As we indicated earlier (see STEEL, Jan. 25, p. 50), transaxles are being held up by lack of satisfactory fluids and the cost of universal joints of the Bendix or Rzeppa type. Pontiac will apparently adapt a version of the Corvair transaxle for its small car to go with its in-line, four cylinder engine, but larger GM cars will rely on present transmissions and on the slim line Hydra-Matic that will be appearing this fall.

Cast Dashboards Gain Favor

General Motors has been experimenting with cast rather than stamped dash and instrument panels. It's going to introduce several diecast dash panels for its 1961 models. AC Spark Plug Div. has apparently taken over control of the panel styling and design because it also must design the instruments to fit into the panel. On Buicks and Oldsmobiles, dashboards will be diecast from aluminum, say supplier sources. Pontiac is getting a zinc diecast unit that's 67 in. wide.

Chevrolet will be checking material costs in its program. Panels will be supplied in zinc, magnesium, and aluminum. Here's an unconfirmed report: The Lark will have a molded plastic dashboard, but it's doubtful that it will be programed for '61 cars. Next week, STEEL will report on other component changes being programed for 1961 models.

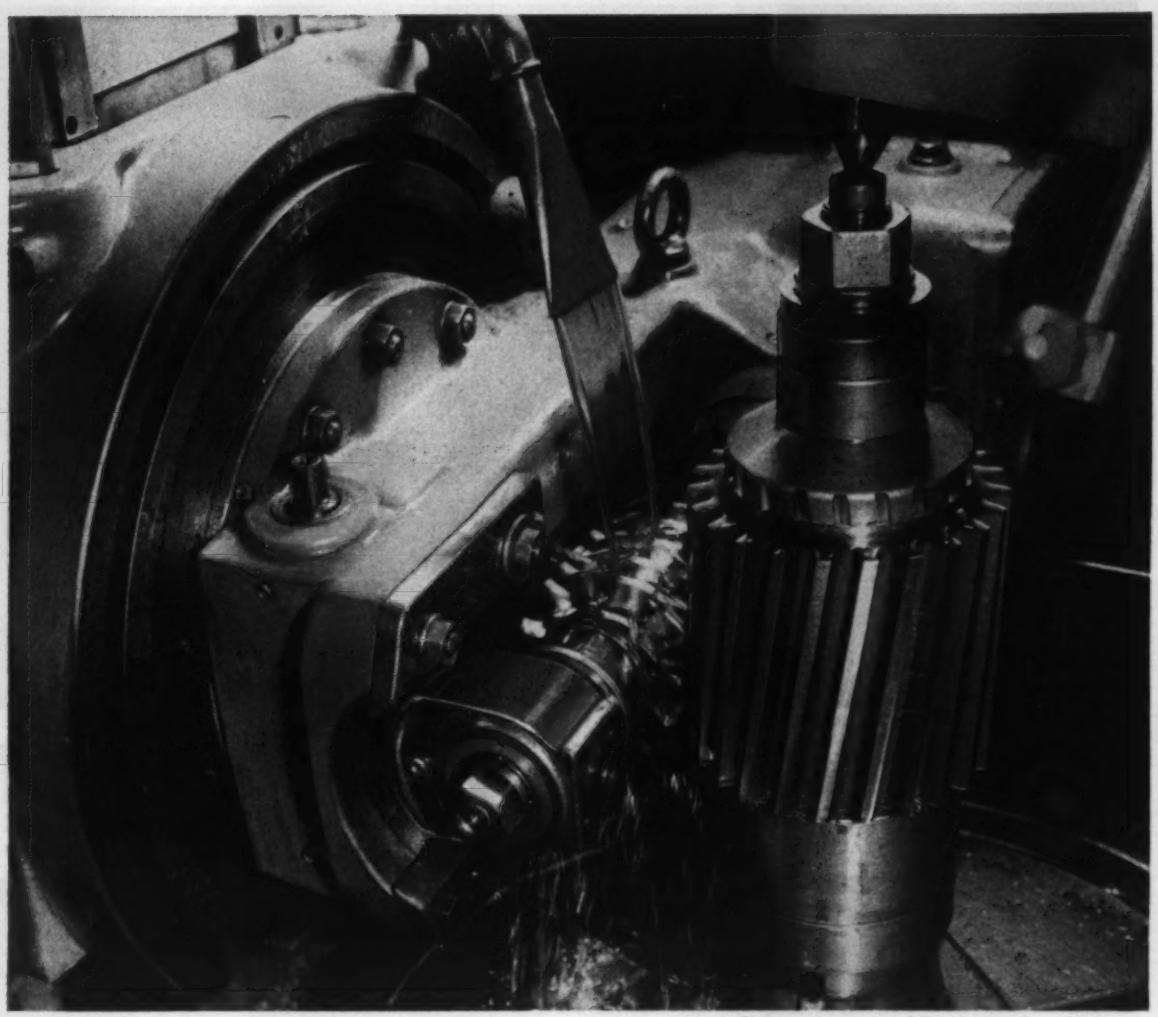
U. S. Auto Output

Passenger Only

	1959	1958
January	545,757	489,515
February	478,484	392,132
March	576,085	357,048
April	578,825	316,594
May	546,817	349,613
June	557,994	337,446
July	555,418	321,017
August	239,152	180,447
September	258,157	130,460
October	507,530	261,701
November	254,527	514,152
December	494,931	593,920
Totals	5,593,677	4,244,045

Week Ended	1960	1959
Jan. 2	112,113	97,664
Jan. 9	163,249	133,362
Jan. 16	173,713	135,953
Jan. 23	175,060	126,843
Jan. 30	174,017†	119,678
Feb. 6	173,000*	114,282

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.



Photograph courtesy of Philadelphia Gear Corporation

Aristoloy LEADED* provides freer machining with no sacrifice of tensile strength at PHILADELPHIA GEAR

ARISTOLOY STEELS

The very qualities that make good gear steels—high-tensile strength, extreme wear and load resistance—make them difficult and expensive to machine.

Philadelphia Gear Corporation solved this problem by switching to Copperweld leaded steel.

This helical gear, for example, is being cut from a bar of Aristoloy 4140 leaded which has been heat treated to a 300 to 320 Brinell Hardness. The lead addition permits an increase in spindle RPM, increased hob feed and improvement in the number of pieces per tool grind.

But none of the desirable strength qualities required of a gear steel are reduced by the minute lead particles. They act as built-in lubricant and in no way affect the physical properties.

Write today for Leaded Steel booklet or new Products & Facilities Catalog.

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COPPERWELD STEEL COMPANY

ARISTOLOY STEEL DIVISION • 4005 Mahoning Ave., Warren, Ohio • EXPORT: Copperweld Steel International Co., 225 Broadway, New York 7, N. Y.

This 3¢ screw cuts costs $24

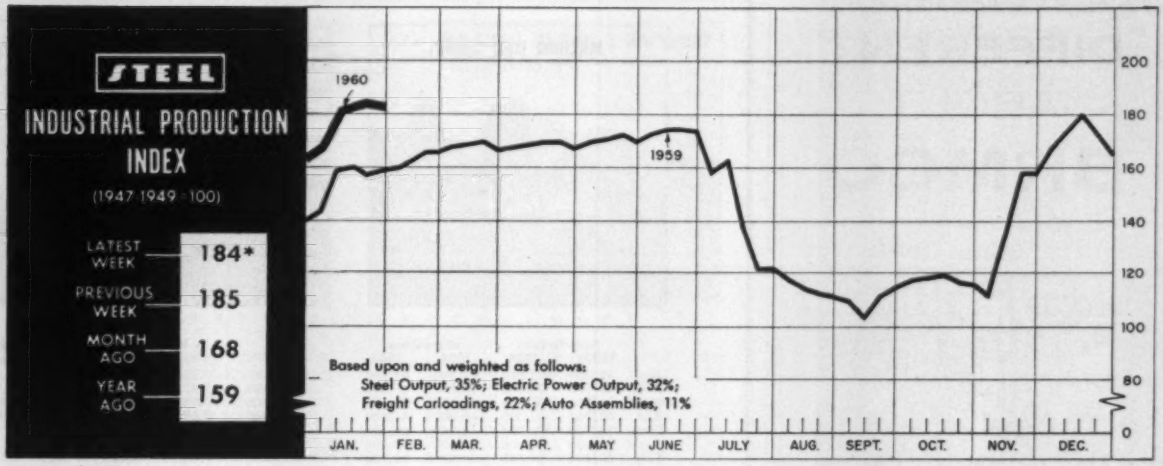
83% saving on fasteners per compressor unit revealed by RB&W survey... substituting standard cap screws for alloy screws.

This was no case of cutting corners on fastener quality. Nor was it in any way a compromise with good engineering. It was rather a reflection of the ability of the RB&W Fastener Man to look realistically at a product, and its blueprint specifications, and know what fasteners can best do the job.

His inspection showed that alloy socket head cap screws were being used for external connections which did not require such costly steel for tight joints. Nor were they installed in tight spots or recessed holes. Why then *waste* their cost? His report recommended switching to bright cap screws. Sufficient joint strength would be obtained. But instead of spending $28.88 for 147 socket screws, the unit would take $4.88 worth of cap screws . . . a saving of $24 *per unit*, and pure profit!

Want to be sure you're avoiding needless costs in fastener usage, and getting the *most* from your fastener dollars? Ask an RB&W man to make a survey. No obligation. Contact Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, N. Y.

Plants at: Port Chester, N. Y.; Coraopolis, Pa.; Rock Falls, Ill.; Los Angeles, Calif. Additional sales offices at: Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas; San Francisco. Sales agents at: Cleveland, Milwaukee; New Orleans; Denver, Fargo. Distributors from coast to coast.



*Week ended Jan. 30.

Business Reaches High Plateau

BUSINESS BAROMETERS are showing the first signs of topping out. The business boom anticipated for the first half certainly is not spent yet, but the terrific pressure which followed the steel settlement has all but vanished.

Steel is in plentiful supply; auto dealers' showrooms no longer have that bare look; fears of a steel price rise have abated.

Those are but a few of the elements that will contain the height of the boom. But if the performance of most of the business indicators continue as they did in December and early January, the economy should travel along a high plateau for some time.

• **Index Levels Off**—STEEL's industrial production index is one of the barometers which showed the greatest gains following the return of the steelworkers, but it is now showing "leveling off" signs. After rising to a record during the week ended Jan. 23 (revised reading was 185 per cent of the 1947-49 base), the trend line settled back a notch to the previous high of 184 during the week ended Jan. 30.

The cause: A slight weakness in both steel and auto production, the two elements largely responsible for the dramatic upsurge within the last two months. Output of steel for ingots and castings slipped below the 2.7 million ton a week mark for the first time since early December (with the exception of the Christmas week). However, the difference between last week's output of 2,693,000 net tons and the all-time record is a mere 39,000 tons a week. With inventories nearing normal, there is little likelihood of any more record breaking weeks in the near future.

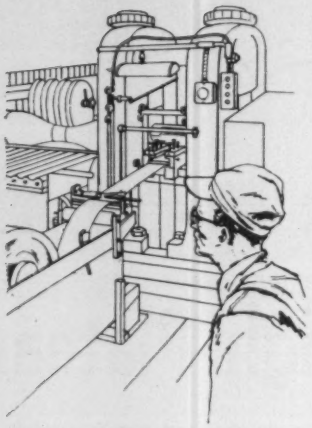
• **What Route for Autos?**—One of the most critical situations on the industrial scene today is in motordom. The hour of decision on future production can't be too far off. Output is holding at peak levels;

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,693[1]	2,717	2,288
Electric Power Distributed (million kw-hr)	14,200[1]	14,523	13,151
Bituminous Coal Output (1000 tons)	8,655[1]	8,825	8,005
Crude Oil Production (daily avg—1000 bbl)	7,150[1]	7,190	7,107
Construction Volume (*ENR*—millions)	$245.2	$372.9	$418.2
Auto, Truck Output, U. S., Canada (*Ward's*)	216,512[1]	217,673	152,257
TRADE			
Freight Carloadings (1000 Cars)	600[1]	587	583
Intercity Truck Tonnage (changes from year ago)	+8.7%	+6.9%	...%
Business Failures (Dun & Bradstreet)	302	292	296
Currency in Circulation (millions)[3]	$31,650	$31,910	$31,150
Dept. Store Sales (changes from year ago)[3]	+8%	+3%	+5%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$25,806	$27,631	$25,116
Federal Gross Debt (billions)	$291.7	$291.8	$286.5
Bond Volume, NYSE (millions)	$28.5	$27.3	$33.2
Stocks Sales, NYSE (thousands of shares)	14,005	14,219	18,720
Loans and Investments (billions)[4]	$102.8	$104.0	$95.6
U. S. Govt. Obligations Held (billions)[4]	$26 9	$27.4	$32.3
PRICES			
STEEL's Finished Steel Price Index[5]	247.82	247.82	247.82
STEEL's Nonferrous Metal Price Index[6]	234.0	234.2	218.2
All Commodities[7]	119.5	119.3	119.5
Commodities Other than Farm & Foods[7]	128.6	128.7	127.4

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1960, 2,849,306; 1959, 2,831,846. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1936-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.

WHAT'S
DIFFERENT
ABOUT
BRMCO



BRMCO BRONZE, an alternate for phosphor bronze with similar characteristics, is a cold workable alloy noted for its toughness, ductility, uniform quality, high tensile strength, and high electrical and thermal conductivity.

BRMCO developed this special high quality, inexpensive copper base alloy with a leading electrical manufacturer, and has supplied it to many major electrical and electronic manufacturers.

BRMCO BRONZE is also used where spring quality, corrosive resistance, strength and uniformity are prime considerations—for fuse clips, hardware items, springs, plating racks, blade switches, electrical contacts, outlets, circuit breakers and others.

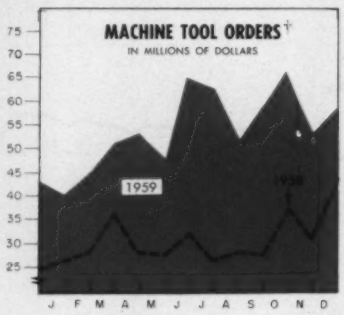
For better products and lower metal working costs, try BRMCO BRONZE.

We'll be happy to send you samples for your own testing and analysis. Simply write, or call collect.

BRMCO

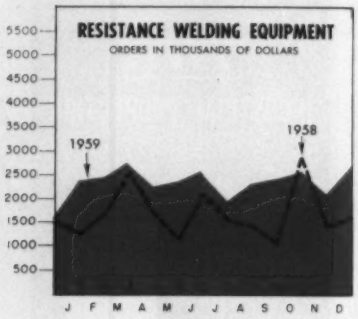
Bridgeport Rolling Mills Company
BRIDGEPORT, CONNECTICUT
Subsidiary of Atlantic Coast Industries, Inc.
FINE QUALITY ALUMINUM, BRASS AND BRONZE IN STRIP AND ROLLS

THE BUSINESS TREND



	New Orders 1959	New Orders 1958	Shipments 1959	Shipments 1958
Jan.	41,050	26,850	31,300	57,800
Feb.	45,400	28,300	36,050	48,050
Mar.	51,550	36,150	45,750	54,150
Apr.	53,200	28,300	45,000	50,900
May	48,700	28,050	41,000	50,100
June	65,400	32,100	50,050	45,500
July	63,400	26,550	40,600	29,700
Aug.	52,200	28,300	40,300	29,800
Sept.	58,850	28,100	46,150	34,900
Oct.	66,650	37,000	51,500	41,400
Nov.	54,250	30,700	46,600	33,650
Dec.	58,800*	43,900	63,700*	43,950
Totals	659,450*	374,300	538,000*	519,900

†Metal cutting and metal forming.
*Preliminary.
Charts copyright, 1960, STEEL.



	Net Orders 1959	Net Orders 1958	Shipments 1959	Shipments 1958
Jan.	2,396	1,243	1,427	1,422
Feb.	2,457	1,683	1,889	1,615
Mar.	2,811	2,550	2,179	1,659
Apr.	2,258	1,684	2,193	1,963
May	2,407	1,121	2,019	1,750
June	2,597	2,113	2,702	2,346
July	1,980	1,534	2,269	2,342
Aug.	2,322	1,431	2,928	1,419
Sept.	2,435	1,060	2,113	1,125
Oct.	2,599	2,885	2,097	1,559
Nov.	2,131	1,409	1,597	1,102
Dec.	2,768	1,554	2,353	1,357
Totals	29,161	20,258	25,766	19,659

Resistance Welder Manufacturers' Assn.

new car stocks are building faster than expected; sales have been slow to respond after the end of the strike in the steel industry. Ever since mid-December, auto makers have adopted a wait-and-see attitude, but so far they haven't seen too much of an encouraging nature. Stocks crossed into February at about the 800,000 unit mark. Says *Ward's Automotive Reports*: "In only two other years (1958 and 1956, both poor automotive years) have inventories shattered that mark at so early a date."

Unless sales figures for the last ten-day selling period of January show significant improvement, look for assembly activity to slow down by 15 to 20 per cent this month.

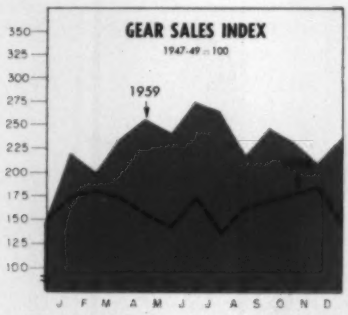
One noteworthy feature of the index is the record of 14.523 billion kw-hr established during the earlier week by the electricity industry. Cold weather and unusually heavy industrial consumption worked together to keep this portion of the index from losing strength as it usually does following the holidays.

Others Hold Out Hope

Among the many other business indicators, evidence is still lacking to support the "topping out" notion because of the lag in data collection. However, the latest information does show that the current high level is well founded.

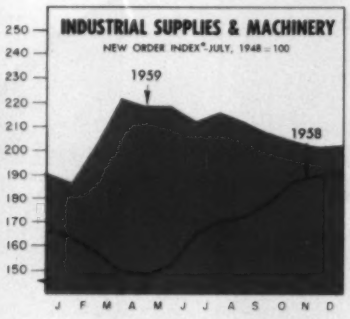
Among the approximately 30 trend indicators charted periodically on these two Trend pages, December information is available for 17. Of those dealing with production or shipment of goods, four showed recovery and four were either down from November's levels or showed no marked improvement. (Steel supplies were still a problem with many metalworkers during much of the month.) Of seven new order series, only two failed to improve in December.

• **Employment** — Near record employment quickly followed the strike settlement. All major S.I.C. classifications in the metalworking industry — primary metals, fabricated metal products, machinery, electrical machinery, and transportation —showed substantial gains. Combined with higher wages (the metalworking average rose from $2.51 an hour in November to $2.54 in December) and a longer workweek (from November's 39.9 hours to 40.9 in December) personal income went up substantially. For the nation as a whole, it advanced to



	1959	1958	1957	1956
Jan. ...	218.6	174.5	259.3	245.5
Feb. ...	199.9	179.1	239.5	256.2
Mar. ...	234.3	173.7	262.4	276.5
Apr. ...	255.6	153.2	221.7	264.7
May ...	241.0	142.2	263.2	275.6
June ...	274.2	173.8	215.9	245.4
July ...	262.8	133.3	211.4	286.7
Aug. ...	213.3	162.1	225.8	219.5
Sept. ..	243.9	170.7	174.9	230.5
Oct. ...	230.5	175.9	207.0	299.8
Nov. ...	208.7	182.7	165.3	216.2
Dec. ...	233.9	145.5	150.8	235.7
Avg ...	234.7	163.9	216.4	254.4

American Gear Mfrs. Assn.



	1959	1958	1957	1956
Jan.	186	163	221	190
Feb.	202	157	219	190
Mar.	221	149	210	190
Apr.	218	148	203	195
May	218	152	199	199
June	212	164	199	197
July	216	170	197	203
Aug.	212	172	197	211
Sept.	207	178	203	203
Oct.	204	187	192	206
Nov.	202	189	180	220
Dec.	202	190	167	218

*Seasonally adjusted.
Amer. Supply & Machinery Mfrs.' Assn.

a record annual rate of $390.7 billion, bringing the total for the year to record $380.1 billion.

• **Orders** — The most encouraging sign for future business is the activity in new orders, especially for capital goods. Freight car orders in December, at 10,560 units, were the second highest for the year. Machine tool makers booked $58.8 million for cutting and forming tools that month, up moderately from the November figure (see graph, Page 64). Producers of resistance welding equipment recorded their second best order month of 1959 with $2,768,000. (See graph and table, Page 64.) Manufacturers of industrial furnaces had their best month since January, 1956. Orders totaled over $13.4 million.

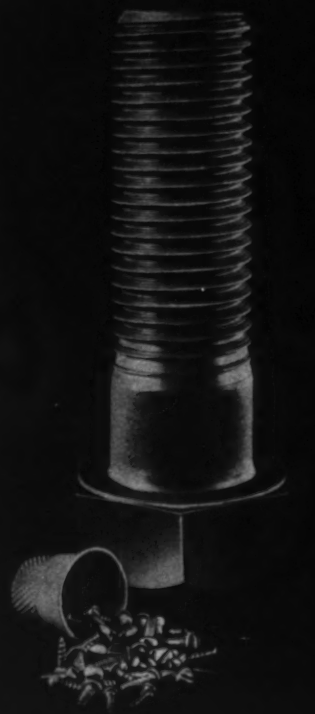
In the lighter durables, gear orders climbed to 233.9 per cent of the 1947-49 base, about equal to the monthly average for 1959. (See graph above.) But the new order index for industrial supplies held to November's strike depressed level of 202 (July, 1948 = 100).

• **Production**—Although the Federal Reserve Board's revised industrial production index climbed to within 1 point of the record, not all industries took part in the spurt. Appliances, in most cases, dropped a little more than seasonally in December. But producers of capital goods worked at about the best rate of the year. Machine tool makers' shipments totaled $63.7 million for both metal cutting and metal forming machines.

• **Construction**—Trends in the construction industry have the experts guessing about the outlook for 1960. Just when they thought housing demand was about spent for the year, the annual rate of new starts bounced back from annual rates of 1.18 million in October and 1.21 million in November to 1.31 million in December.

But awards for future construction did not do as well. F. W. Dodge Corp. reports December's awards came to only a little over $2.2 billion. While this was below both November (which is normal) and December, 1958 (which is not), Dodge's index did manage to show a slight recovery in the latest month. However, the weekly award figures reported by *Engineering News-Record* have shown little indication that 1960 is going to be a record breaker. January awards were off the December pace and the year-ago figure.

One order, one source
. . . every fastener need



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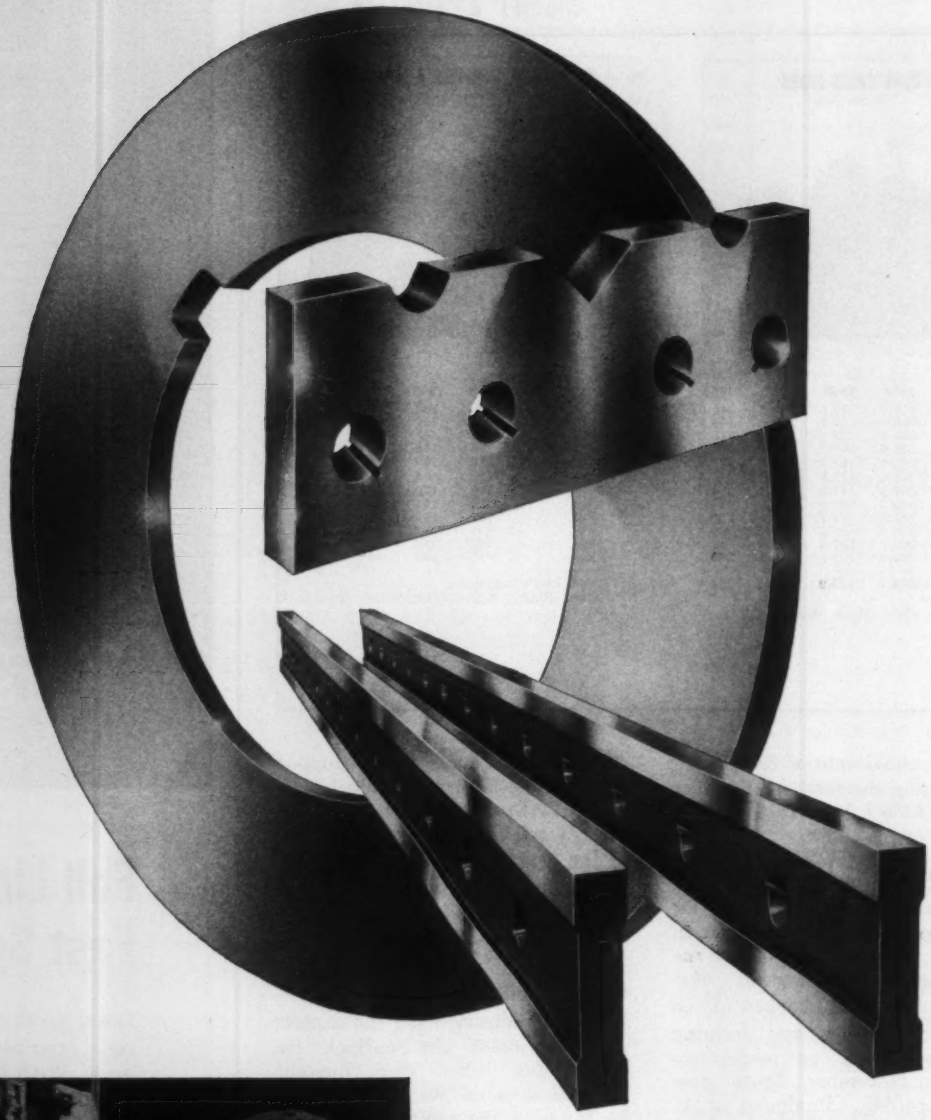

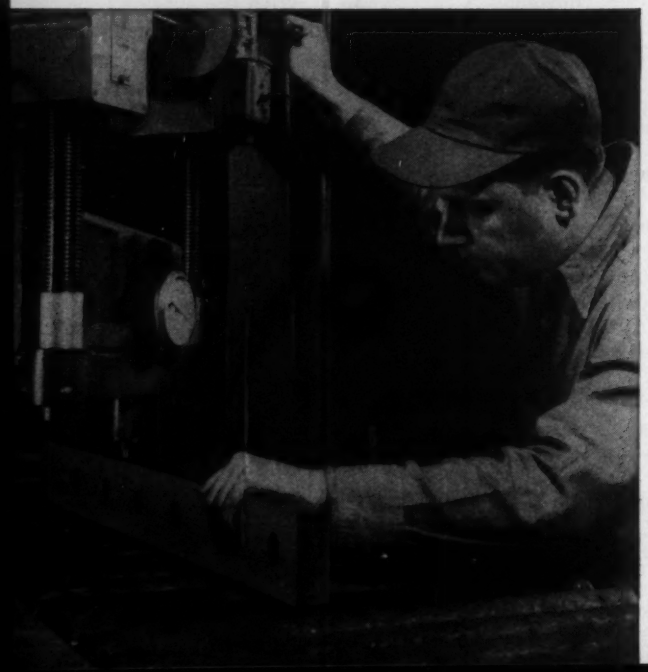

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JOSEPH H. REIFF
Houdaille v. p.-mfg. eng.

EUGENE J. ANSPACH
Gorton Machine works mgr.

N. D. ABBEY JR.
Abbey Etna president

HAROLD J. BUESCHER
Brad Foote Gear pres.

Joseph H. Reiff was appointed vice president-manufacturing engineering for **Houdaille Industries Inc.**, Buffalo. He joined Houdaille last July. He was with Crane Co.

Charles C. Morgan was appointed general manager-operations, **Columbia-Geneva Div.**, San Francisco, U. S. Steel Corp. He was general superintendent of the division's Geneva Works near Provo, Utah.

David D. Doran was made director of research and development of **Weston Instruments Div.**, West Englewood, N. J., Daystrom Inc.

Henry C. Schwenk was made vice president-sales; **William R. Perez Jr.** assistant secretary of **Henry Pratt Co. Inc.**, Chicago.

McCord Corp., Detroit, elected **D. S. Fields** president, succeeding **W. G. Hancock**, retired. **L. M. Elliott** was made first vice president. **W. T. Meredith, W. E. Imhoff,** and **J. R. Hayward** were elected vice presidents.

J. Marshall Smith was made plant manager, Warren, Pa., **Sylvania Electric Products Inc.**, a subsidiary of General Telephone & Electronics Corp.

John Farran was named director of services, **Lincoln Electric Co.**, Cleveland, to succeed **G. E. Tenney.**

Vernon C. Thomas succeeds **Ralph B. Roth**, retired, as vice president, secretary, and director of purchases, **Ludlow-Saylor Wire Cloth Co.**, St. Louis.

Eugene J. Anspach was made works manager of **George Gorton Machine Co.**, Racine, Wis. He succeeds **Charles Gorton**, vice president, who is organizing an enlarged Procurement Dept. Mr. Anspach was with Line Material Industries.

N. D. Abbey Jr. was elected president, **Abbey Etna Machine Co.**, Perrysburg, Ohio. He was general plant manager and vice president-foreign sales. **John J. Mullen** was made administrative assistant to the president.

John E. Walker succeeds **Walter H. Haber** as manager, **Master Electric Div.**, Dayton, Ohio, **Reliance Electric & Engineering Co.** Mr. Haber, vice president of Reliance, returns to Cleveland headquarters.

R. L. Siebert was elected president-treasurer, **Milwaukee Electric Tool Corp.**, Milwaukee. **Lester H. Erickson**, a vice president, also was elected secretary, continuing as general manager.

Edward J. Sohn was appointed vice president-general manager, **Yuba-Bedford Corp.**, Bedford, Ind., subsidiary of Yuba Consolidated Industries Inc. **Henry J. D'Aragon** was elected vice president, Yuba Consolidated Industries, with headquarters in the New York district office.

Beckman & Whitley Inc., San Carlos, Calif., appointed as vice presidents: **Myron B. Baldwin**, manager, Missile Products Div.; **Joseph R. Greer**, manager, Instrument Div.

Harold J. Buescher was elected president, **Brad Foote Gear Works Inc.**, Chicago, to succeed **Gunnar E. Gunderson** who fills the new posts of chairman and chief executive officer. Mr. Buescher, former secretary-treasurer, continues duties as treasurer.

William J. MacNeill was named to the new post of works manager, **Federal Malleable Co. Inc.**, Milwaukee.

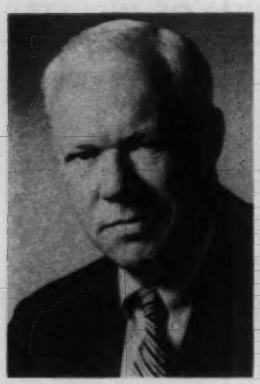
Gordon W. Edwards, former vice president-sales, Kensico Tube, joined **Bridgeport Brass Co.**, Bridgeport, Conn., as special sales representative.

J. F. Powers Jr. was appointed vice president-sales manager of **Chiksan Co.**, Brea, Calif. He was eastern regional sales manager.

T. R. Rooney, vice president-production, **Consolidated Western Steel Div.**, Los Angeles, U. S. Steel Corp., was appointed special assistant to the president. He is succeeded by **Lee S. Cline.**

A. T. Fragomen was named manager, Erection Dept., **Babcock & Wilcox Co.'s Boiler Div.**, Barberton, Ohio. He is succeeded by **L. V. O'Connor** as district erector in Chicago.

Austin Co., Cleveland, named **Rollin R. Eiber** a vice president. He is manager, Midwest district, Chicago. **E. W. Hollister** was made manager, Cleveland district, to succeed **C. W. Wolfe**, who continues as a vice president. **Charles R. Wing**



J. F. MILLER

M. J. PERRIN

vice presidents at Hartford Machine Screw

FRANK C. HOLMES

BURTON F. LEWIS

Baird Machine vice presidents

was named Southwest district manager, Houston.

Hartford Machine Screw Co., Hartford, Conn., promoted **J. F. Miller** from general sales manager to vice president-sales; **M. J. Perrin** from factory manager to vice president-manufacturing.

Armco Div., Armco Steel Corp., Middletown, Ohio, named **G. W. Breiel** manager-sales administration. He is replaced as western area sales manager by **Sidney A. Yager. Paul F. Pardonner**, Detroit district sales manager, was promoted to manager-central area sales, and is replaced by **Robert H. Perry**.

John H. Garwood was made director of organizational planning, **Vickers Inc.**, Detroit.

Howard W. Geyer, director of quality control, Cleveland plant, **Warner & Swasey Co.**, was made general superintendent of the plant. **Peter Rusnov**, manager of methods, was named chief industrial engineer.

Baird Machine Co., Stratford, Conn., named **Frank C. Holmes** vice president-sales; **Burton F. Lewis** vice president-engineering. **C. P. Foreman** was made chief tool engineer. Sales managers for divisions are: **C. B. Bennett**, barrel finishing equipment; **William D. Bower**, chucking equipment; **George Chapman**, presses and metal forming equipment; **W. L. Hancock**, Beaver Tractor Div.

Theodore M. Dillaway was elected vice president; **George P. Schivley** vice president - manufacturing of **Buffalo Forge Co.**, Buffalo. Mr. Dillaway continues as secretary.

Daniel E. Murphy was made director of the **Datalab Div.** of Consolidated Electrodynamics Corp., Pasadena, Calif., subsidiary of Bell & Howell Co. He joined Datalab in 1958 as administration manager.

Charles W. Finkl was elected vice president-operations and engineering, **A. Finkl & Sons Co.**, Chicago. He was in charge of engineering and research which continue under his direction.

Paul L. Daley was made manager-research laboratory at **National Tube Div.**, Pittsburgh, U. S. Steel Corp. He succeeds **Walter P. Benter**, retired.

John F. Bramham was made assistant to the general manager, **Pilgrim Drawn Steel Div.**, Plymouth, Mich., Automotive Materials Corp. He continues as sales manager.

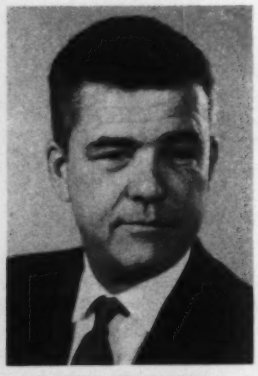
Elmer E. Braun was made works manager, Central Foundry Div., **General Motors Corp.**, at Saginaw, Mich. He was manager-ferrous metals operations.

Robert W. Bryan was named vice president-operations, **Youngstown Welding & Engineering Co.**, Youngstown. He succeeds the late **T. J. Featheringham**. Mr. Byran was vice president of Guide Co., engineering firm.

Robert Price was made Atlanta

HOWARD W. GEYER

Warner & Swasey gen. supt.



DANIEL E. MURPHY

Datalab Div. director

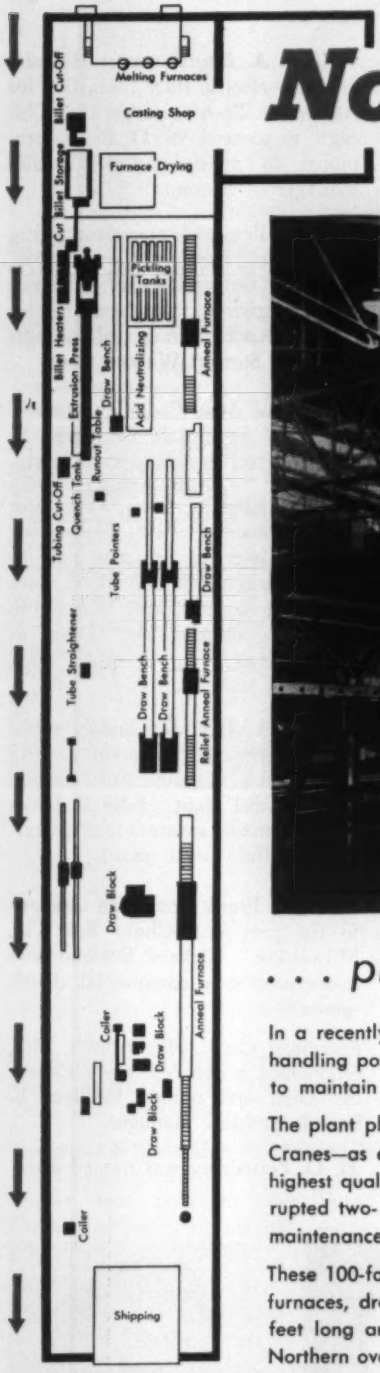
CHARLES W. FINKL

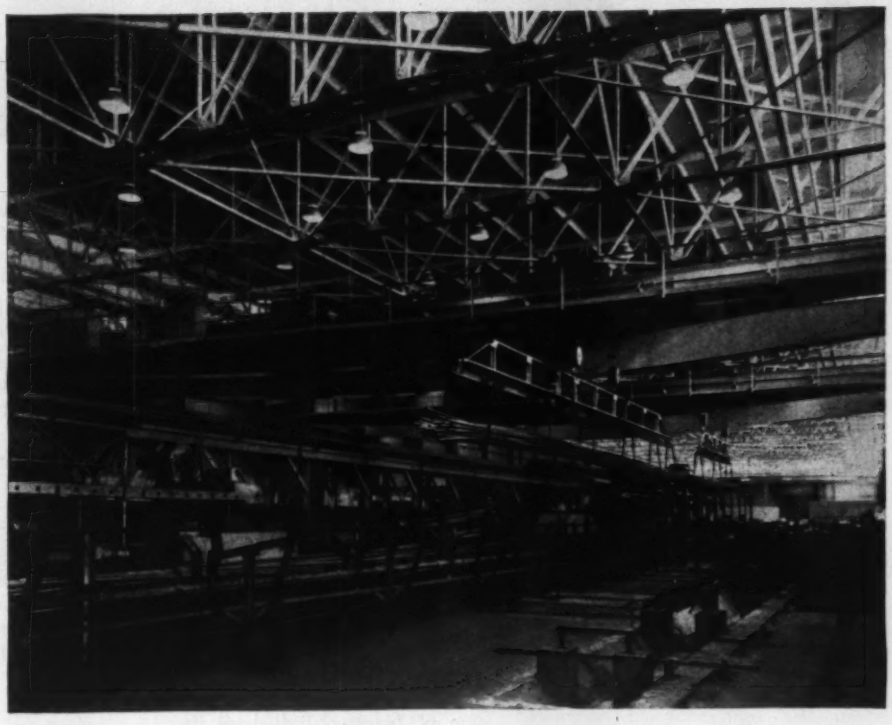
Finkl & Sons v. p.

ROBERT W. BRYAN

Youngstown Welding v. p.

Northern Cranes





. . . preferred in a large tube mill

In a recently built tube mill all production operations are planned around the most effective handling possible of materials and work. The two overhead cranes shown above are essential to maintain production in this plant; it cannot function without them!

The plant planning staff, after comprehensive study and investigation, decided that Northern Cranes—as evidenced in many other strategic, similar installations—provided the substantial, highest quality engineering design and construction necessary for fast, dependable, uninterrupted two- and three-shift operation six days every week with equally essential production maintenance duty over week-ends.

These 100-foot span Northern Cranes were installed to serve all needs ranging from annealing furnaces, draw benches, tube straighteners and coilers to shipping. Loads ranging up to 157 feet long are handled by the two cranes operating together. This is convincing proof that Northern overhead cranes can be fully integrated as an essential part of processing operations.

Our booklet SE-108-F gives details of their many outstanding features. Let us send it to your planning and layout executives.

Invest in Northern Cranes for highest quality service in overhead handling.

MATERIALS HANDLING EQUIPMENT

SE-2031

NORTHERN ENGINEERING WORKS

210 Chene Street • Detroit 7, Michigan

ANDREW L. PONTIUS WILLIAM E. BRUSE KENNETH C. Mac KAY

Illinois Tool Works executive appointments

branch manager of **Aluminum Foils Inc.**

Armco Div., Armco Steel Corp., Middletown, Ohio, named **James G. Wikoff** manager, carbon steel products; **William Jones** manager, magnetic steel products; **Joseph P. Butterfield** manager, stainless steel products.

Andrew C. Dickson was made chief manufacturing engineer for **AP Parts Corp.**, Toledo, Ohio.

R. Kingsley Hopkins Jr. was made Cleveland district manager for **Capewell Mfg. Co.** He is succeeded as sales engineer, New York area, by **Karol Stark.**

L. R. Stallings was made special products sales manager, **Union Carbide Metals Co.**, a division of Union Carbide Corp., New York.

Norval T. Grubb was made manager, Construction Equipment Div., **Electric Steel Foundry Co.**, Portland, Oreg. He was assistant manager.

Illinois Tool Works, Chicago, appointed **Andrew L. Pontius** vice president-operations, Product Divisions. He was general manager, Shakeproof Div., Elgin, Ill., and is succeeded by **William E. Bruse**, former Shakeproof works manager. **Kenneth C. Mac Kay** was named plant manager succeeding Mr. Bruse.

John F. Cain was named president, **Greer Hydraulics Inc.**, New York. He was executive vice president.

Joseph C. Profita was made general manager, **Narmco Resins & Coatings Co.**, Costa Mesa, Calif., division of Narmco Industries Inc.

D. K. Kauffman was made manager of manufacturing at **Ceilcote Co.**, Cleveland. He was plant manager, Plastics Div.

David M. Salls, manager of gas industry marketing for **Cooper-Bessemer Corp.**, Mt. Vernon, Ohio, was named product sales manager for the company's RT-248 gas turbine.

William A. Branic was made sales manager-electric rider truck line for **Automatic Transportation Co.**, Chicago, to succeed **W. D. Black**, promoted to assistant general sales manager of Automatic.

C. W. Allen was made managing director of Stewart-Warner Ltd., Harlow, England. He succeeds **S. D. Hagerman**, who goes to Chicago as export manager of the parent firm, **Stewart-Warner Corp.**

Alan Wood Steel Co., Conshohocken, Pa., appointed **Thomas E. Roberts** steel works metallurgist.

General Electric Co.'s Computer Dept., Phoenix, Ariz., appointed **DuPuy Cayce** to the new post of sales manager for advanced data processing systems; and **Warren F. Prince** to succeed Mr. Cayce as sales manager for business data processing equipment.

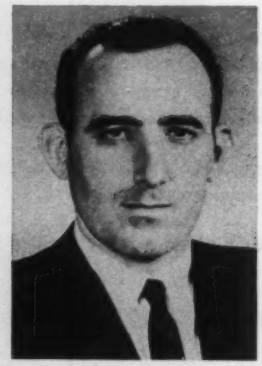
William A. Hoff was made assistant superintendent-blooming and billet mills at **Republic Steel Corp.'s** Chicago steel plant. **John E. Johnson** was made assistant chief engineer, Buffalo steel plant.

Arthur J. Frank was made assistant to the president, **Chain Belt Co.**, Milwaukee. **Richard Seaman** was made manager, commercial development.

Pangborn Corp., Hagerstown, Md., established a new Vibratory Finishing Div., and named **William E. Brandt** division manager.

H. D. Leisenring was named direc-

NORVAL T. GRUBB
Electric Steel Foundry post



D. K. KAUFFMAN
Ceilcote mfg.-mgr.

DAVID M. SALLS
Cooper-Bessemer sales post

WILLIAM E. BRANDT
Pangborn division mgr.

DR. JAY TOL THOMAS
Minneapolis-Honeywell post

CARL R. LINDELL
F. Jos. Lamb plant mgr.

BERTRAM J. MILLEVILLE
Ohio Injector v. p.

HARRY D. FERGUSON
Rockwell div. p. a.

LAWRENCE F. BOLAND
Beryllium exec. v. p.

HENRY F. DeLONG
GE-Metallurgical Products post

tor of marketing, **Smith-Erie Div.**, New York, A. O. Smith Corp.

Harry D. Ferguson was named purchasing agent at **Rockwell Mfg. Co.'s** Instrument Div. in Tulsa, Okla. He was a buyer for the company's Kearney, Nebr., and Uniontown, Pa., divisions.

Lawrence F. Boland, vice president, was elected to the new post of executive vice president, **Beryllium Corp.**, Reading, Pa. He will co-ordinate operations and continuing expansion of all company activities.

Howard W. Read was elected vice president-marketing, **Alan Wood Steel Co.**, Conshohocken, Pa. He succeeds **Perry L. Francis,** elected senior vice president, acting as marketing consultant.

Metal & Thermit Corp., New York, elected three vice presidents: **Harry W. Buchanan** is manager, General Sales Dept.; **James L. Oberg** is general manager, Metals & Minerals Div.; **John K. Parks** is general manager, Detinning Div.

Henry F. DeLong was appointed general manager, Metallurgical Products Dept., Detroit, **General Electric Co.** He succeeds **Dr. C. E. Reed,** now general manager, Chemical & Metallurgical Div., Bridgeport, Conn. Mr. DeLong was general manager, Cathode Ray Tube Dept., Cleveland lamp plant.

W. L. Parcell was elected executive vice president, **Ridge Tool Co.**, Elyria, Ohio.

Firth Sterling Inc., Pittsburgh, appointed **William J. Lohmeyer** manager of high speed steel sales.

George C. Bless was made executive vice president, **Morris P. Kirk & Son Inc.**, Los Angeles, subsidiary of National Lead Co.

John W. Lohnes was appointed director of sales, **Pittsburgh Metallurgical Co.**, Niagara Falls, N. Y.

J. E. Carroll was named sales manager, **Continental Conveyor & Equipment Co.**, Birmingham.

Dr. Jay Tol Thomas was made director of engineering, Boston Div., **Minneapolis-Honeywell Regulator Co.**, succeeding **T. Kemp Maples** who has been acting in that post in addition to his continuing duties as technical assistant to the vice president in charge of the division. Dr. Thomas was manager, Systems Laboratory, Syvania Electric Products Inc., a subsidiary of General Telephone & Electronics Corp.

Carl R. Lindell was promoted to plant manager, **F. Jos. Lamb Co.**, Detroit. He was chief engineer.

Bertram J. Milleville, former director-engineering and research, was elected vice president of engineering and research at **Ohio Injector Co.**, Wadsworth, Ohio.

Robert L. Newtson was promoted to plant manager of **General Motors Corp.'s** Fabricast plant, Bedford, Ind., Central Foundry Div. He was production manager of the plant.

Stanley Shea was made New York district sales manager, **Malsbary Mfg. Co.**

Worthington Corp., Harrison, N. J., elected **Eugene P. Hagan** vice president. He continues as comptroller.

Norman C. Macdonal was made sales manager, **James E. Burke** assistant sales manager, **Rawlplug Co. Inc.**, New Rochelle, N. Y.

OBITUARIES...

Fredrick C. Sammons, Los Angeles district manager, **General Refractories Co.**, died Jan. 16.

George McKenna, 58, purchasing agent for **Lionite Abrasives Ltd.**, Niagara Falls, N. Y., died Jan. 24.

Lawrence P. Foran, 58, assistant production manager, **Champion Spark Plug Co.**, Toledo, Ohio, died Jan. 25.

Edward M. Falk, 51, sales manager, **W. W. Sly Mfg. Co.**, Cleveland, died Jan. 8.

Ray E. Lawlor, vice president-general manager, **Pilgrim Drawn Steel Div.**, Plymouth, Mich., Automotive Materials Corp., died in Florida Jan. 24.

Bethlehem's Capital Outlay To Jump to $172 Million

BETHLEHEM STEEL CO., Bethlehem, Pa., will boost its capital expenditures this year. It plans to spend about $172 million against $86,744,354 last year and $91,400,769 in 1958. The 1959 program was hampered by the steel strike. As of Dec. 31, 1959, the amount authorized for capital expenditures totaled $197 million.

Work this year will be aimed primarily at improving efficiency of existing properties. No new ingot production units are contemplated. An increase in output will be attained by next year, mainly through greater use of oxygen at the Sparrows Point, Md., and Lackawanna, N. Y., plants.

Greater efficiency in operations is hoped for through co-operation between management and labor, especially at local levels, says A. B. Homer, president.

He estimates the industry's production at 130 million tons of ingots for the year. He anticipates an active first quarter, a slight easing in the second, a decline in the third, and a seasonal pickup in the fourth quarter. Possibly 10 to 15 per cent of finished steel shipments in the first half will go into inventories, he believes.

Union Carbide Expands

Union Carbide Nuclear Co., Bishop, Calif., has completed a unit for producing a tungsten raw material of high purity, ammonium paratungstate. The plant addition is an extension of the refining stage already in operation at the firm's tungsten mining and processing facilities at that point. The company is a division of Union Carbide Corp., New York.

To Double Plant Capacity

Ingersoll-Humphryes Div., Borg-Warner Corp., Mansfield, Ohio, has launched a $2 million construction program which will double its production capacity of vitreous china plumbing fixtures. The project involves construction of six buildings containing 130,000 sq ft of floor space. Equipment will include a 362 ft continuous kiln and spraying equipment.

Container Firm Expanding

George D. Ellis & Sons Inc., Philadelphia, will increase its floor space by 20 per cent. The firm makes light metal containers, tin cans, and specialties for the metalworking, chemical, petroleum, L-P gas, and surgical supply fields.

Rodney Boosts Capacity

Rodney Metals Inc., New Bedford, Mass., has installed a 12½ in. Sendzimir mill to augment the production capacity of its 25 in. Sendzimir unit. The company specializes in production of thin alloy metal strip and foil. Production of the new mill will be concentrated on foil with thicknesses under 0.005 in.

The new mill is equipped with electronic tension control, permitting production of foil in thickness tolerances never before possible (12 in. wide by 0.0002 in. thick within tolerances of ±3 per cent). The unique design of the reversing Sendzimir mills makes possible extremely close thickness tolerances and fine finishes. Each mill employs a cluster of rolls backed by radial bearings, eliminating gage variation caused by roll deflection.

Hooker to Enlarge Plant

Hooker Chemical Corp., Niagara Falls, N. Y., plans to invest about $10 million in an installation of Hoechst-Uhde, mercury type, electrolytic cells during 1960-61. This will increase production capacity of caustic soda, caustic potash, and chlorine at its Niagara Falls plant. Power will be obtained from the Niagara project of the Power Authority of the State of New York. This installation marks the first phase of a four step, electrolytic cell expansion program at Niagara over the next few years. The next two steps call for supplementary Hooker type diaphragm cells; the fourth, another mercury cell addition.

Hardinge Expands Foundry

Hardinge Mfg. Co., a subsidiary of Hardinge Co. Inc., York, Pa., will spend $300,000 to expand and modernize its foundry facilities. The enlarged foundry will embrace about 32,000 sq ft of floor area and will house the latest in core ovens, sand mixing apparatus, cranes, and other material handling equipment.

CONSOLIDATIONS

Sawbrook Steel Castings Co., Lockland, Ohio, purchased **Badall Engineering & Mfg. Co.**, Hammond, Ind., which will be operated as Badall Co. Inc. Sawbrook is a subsidiary of Tool Steel Gear & Pinion Co., Cincinnati, producer of hardened products.

Paslode Co., a division of Signode Steel Strapping Co., Chicago, purchased **Crofoot Co.**, Mt. Prospect, Ill., maker of staples and stapling equipment.

First Mississippi Corp., Jackson, Miss., is negotiating for purchase of the **Southern Div.** of Associated Piping & Engineering Co., Gulfport, Miss. The new concern will be known as Gulfport Piping Co. and will make certain piping components used by heavy industries.

NEW ADDRESSES

Young Spring & Wire Corp. moved its headquarters from Detroit to Beverly Hills, Calif. The firm has three facilities in the Los Angeles area: Mobile amateur radio communications equipment is made in Burbank, structural parts for aircraft and missiles are made in Pasadena, and automotive seat components are made in Vernon.

Thermo Electric Co. Inc., Saddle Brook, N. J., moved its Midwest sales offices to enlarged quarters

at 5780 N. Elston Ave., Chicago 46, Ill. Clint White, assisted by James Fabrie, is in charge. The firm makes temperature measuring systems and allied equipment.

National Cylinder Gas Div., Chemetron Corp., Chicago, moved its Northeastern regional office to 1 Belmont Ave., Bala-Cynwyd, Pa. F. E. Cain is manager, assisted by D. R. Baldwin and R. V. Leffler.

General Aniline & Film Corp. moved its headquarters to larger quarters in the Time & Life Bldg., 111 W. 50th St., New York 20, N. Y.

ASSOCIATIONS

American Road Builders' Association, Washington, elected these officers: President, N. L. Teer Jr., Nello L. Teer Co., Durham, N. C.; treasurer, J. N. Robertson; and vice presidents, Armand Keeley, Prismo Safety Corp., Huntingdon, Pa.; G. M. Foster, Indiana State Highway Department, Indianapolis; J. P. Moss, Moss-Thornton Construction Co., Leeds, Ala.; and W. A. Bugge, Department of Highways, Olympia, Wash.

A. G. Zibell, Kohler Co., Kohler, Wis., has been elected president of the **Plumbing Fixture Manufacturers' Association,** Washington.

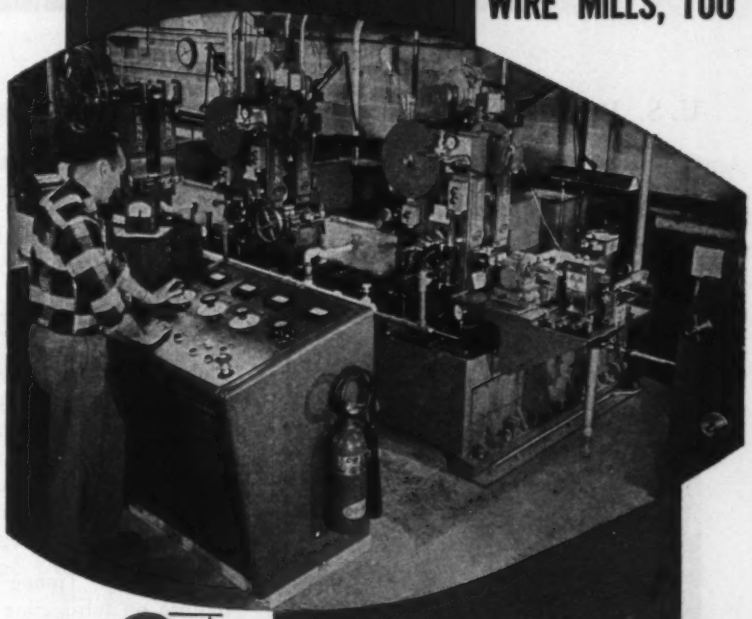
National Association of Waste Material Dealers Inc., New York, has announced nominations for officers for 1960. Members will act on these nominations Mar. 15: President, L. E. Selig, J. Solotken & Co. Inc., Indianapolis; vice presidents, W. H. Daley, Independent Paper Stock Co., San Francisco; Theodore Gruen, International Minerals & Metals Corp., New York; Charles Rubenstein, Central Metal Co. Inc., Plainville, Conn.; and Bernard Schapiro, S. Schapiro & Sons Inc., Baltimore. The name of the organization will be changed to National Association of Secondary Material Industries on June 1.

National Industrial Service Association Inc., St. Louis, will change its name Apr. 1 to Electrical Apparatus Service Association Inc.

FENN

Sets the Pace

WITH PRECISION TANDEM COPPER WIRE MILLS, TOO



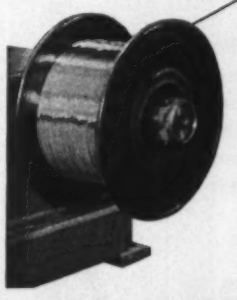
FROM .129

TO .324 .0159

AT 1,000 FPM IN ONE PASS

to these precision tolerances

± .0005" on width
± .00005" on thickness
± .001" on radii of edges



This Fenn line exemplifies the finest in high speed precision wire flattening. It was engineered and built by Fenn to produce from an entry round thin copper tape with critical dimensions at continuous production speeds in excess of 900 fpm. The installation consists of a Fenn Model 082 three stand tandem mill with separate DC variable speed drives. Each stand has carbide shell rolls with both internal and external cooling. Between stands are Fenn No. 51 power-driven edgers and coolant troughs. Exit tape is automatically gaged by electro-limit width gage and Beta Ray thickness gage. Tension and speed synchronization are regulated by dancer roll controls between stands, and at exit end to synchronize the take-up reel which must traverse wind the tape with great precision for the next operation.

Fenn engineers welcome the opportunity to design and build precision mills and related material handling accessories and instrumentation to your exact product requirements. Fenn Wire Flattening Lines are production tested and proven. They incorporate advanced engineering features and versatility found in no other rolling mills. Fenn users enjoy the competitive advantages of greater production resulting from higher rolling speeds and closer tolerances. Comprehensive catalog will be sent upon request.

FENN MANUFACTURING COMPANY • 901 Fenn Road • Newington, Conn.

US RUBBER TRANSMISSION BELTS from the Power Unlimited complete belt line

POWER UNLIMITED...

U. S. Rubber's research, development and manufacturing facilities all combine to produce Endless Transmission Belts that fulfill every Power Transmission need. For example:

U.S. PowerGrip "TIMING" BELT

These belts, invented by "U.S." research and manufactured by the "U.S." unparalleled facilities (in the only plant in the industry devoted exclusively to the production of endless transmission belts), are patented products. They were acclaimed by the Franklin Institute of Philadelphia the greatest power transmission belt invented in this decade.

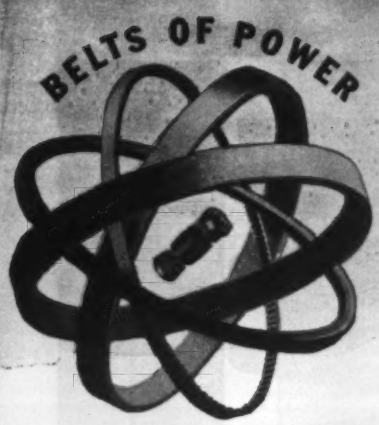
PowerGrip "Timing"® Belts never stretch. They require no lubricating or maintenance. Operating without tension, they prolong the life of bearings. They are used on drives from fleapower to 1,000 hp. Speeds are from imperceptible to the eye and up to 16,000 f.p.m.

U.S. ROYAL V-BELTS

U.S. Royal V-Belts, with 40% greater h.p., are made by entirely advanced automation and curing processes.

They are without question unequalled for service on multiple transmission drives. Their *length-stability* makes this an undisputed fact. This has been proven in actual plant use in all parts of the country—on the West Coast (Ranchers Cotton Oil Co., Fresno, Calif.), the East Coast (The Ruberoid Co., Gloucester City, N. J.) and in a New England paper-making plant, to point out a few. Any U.S. Royal V-Belt will continue to pull its full share of the load long after one or more of the belts on an ordinary set have given up.

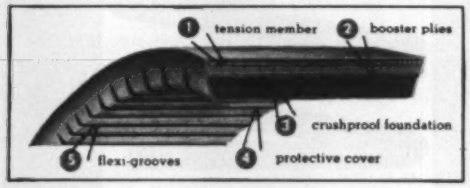
The length-stability of U.S. Royal V-Belts saves you dollars in Time and dollars in INVENTORY.



the only complete line of Transmission Belts

PRESS-CURED V-BELTS

The U. S. Royal line, of course, includes sizes larger than 180". These giant size V-belts are built by a new "U. S." process that practically eliminates length variation and greatly reduces belt matching problems.



VARIABLE SPEED BELTS

This Belt is non-squash, non-sag. This is the belt to do away with Variable Speed Belt problems. Hard, rigid rubber encloses soft rubber containing tension members. The *exclusive* and complete rigidity in these belts prevents squashing.

In plant after plant, users find that lengthwise stretch is just about non-existent. *No sagging*. This belt has complete accuracy regardless of speed changes—whether you switch from 2,000 rpm to 10.

U.S. ROYAL SPEEDAGE KORD ENDLESS BELTS

The U. S. Speedage Kord® Endless Belts are for really high-speed service—up to 18,000 f.p.m. Thin enough to operate over pulleys as small as ½" in diameter. Designed for work on open, serpentine and reverse drives. No seams, splices or laps to cause vibration. Available from stock in a wide range of popular sizes.

SPINNER BELTS

This belt will travel up to 113 mph with no vibration, *no noise*. The reduction in the length of modern spinning machines requires a belt of this high speed. Special "U. S." construction methods make possible building of belt with a minimum of splices, regardless of length. Contamination of yarn is prevented by another unique feature: no rubber on outside surfaces. The belt for uniform twist and smooth spindle operation.

U.S. ROYAL FLAT BELTS

U. S. Spinner Belts are only one type of belt in the U. S. Complete Flat Belt line. "U. S." produces a variety of belts for a multiplicity of services. They each feature a specially woven duck for top strength and tenacity with top-quality friction between plies.

U.S. FLEXIBLE COUPLINGS

Misalignment, whether angular, axial or lateral, is compensated for by this coupling, most versatile ever produced. It provides torsional resilience by angular displacement and insulates both vibrationally and electronically (no metal-to-metal contact).

Design of this coupling is so free of complicated parts that cost is truly low in comparison with other couplings. It will pay you to insist on having these tried on your machinery. The result will be a very desirable reduction in maintenance costs.

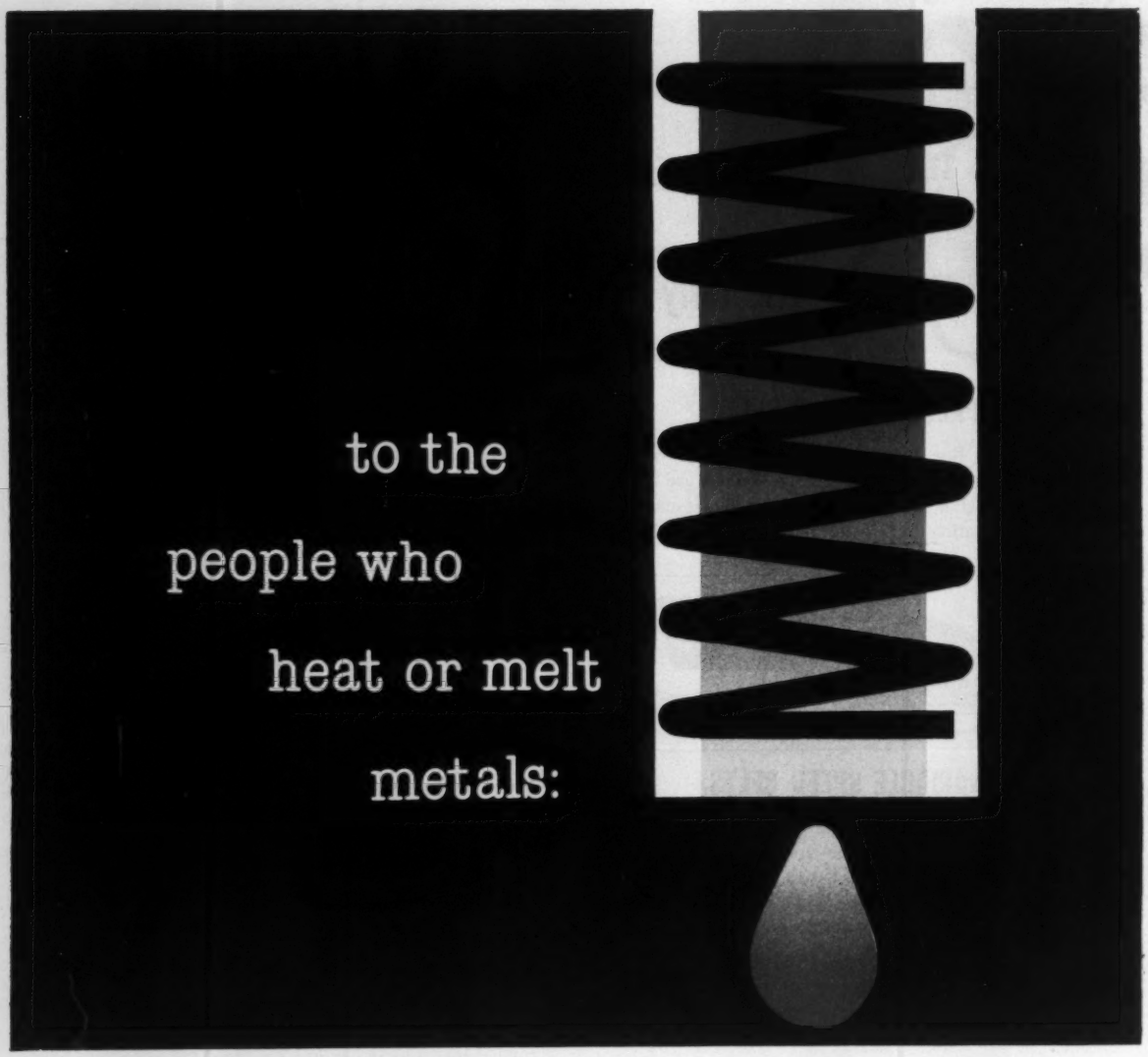
The one and only sure way to get expert transmission engineering service is through your U. S. Rubber Transmission Distributor. He stocks the *only complete* transmission belt line. He never attempts to make one type of belt perform where another type should be used. He is unbiased in seeing that you get the right belt for your needs.

Mechanical Goods Division

United States Rubber

WORLD'S LARGEST MANUFACTURER OF INDUSTRIAL RUBBER PRODUCTS

Rockefeller Center, New York 20, N.Y. In Canada: Dominion Rubber Company, Ltd.



Induction Heating is used to heat all metals, including the new high-temperature alloys and exotic metals, to temperatures ranging from a few hundred degrees to several thousand degrees.

Historically, Induction Heating manufacturers have specialized and have provided a service to specific application areas. This specialization has confined the many advantages of Induction to a few specific fields. Actually, most metalworking operations can be improved by the use of Induction equipment.

By joining the pioneer companies (Ajax Electrothermic, Ajax Engineering and Magnethermic) into one company, we offer a service unavailable before. A single manufacturer of Induction equipment with the background, facilities and product line permits an unbiased evaluation of your heating or melting application.

More A M equipment in use than any other make.

John A. Lyon
President

Ajax Magnethermic CORPORATION

Induction Heating is our ONLY Business

GENERAL OFFICES: Youngstown 1, Ohio

AJAX ELECTROTHERMIC DIVISION
Trenton 5, New Jersey

MAGNETHERMIC DIVISION
Youngstown 1, Ohio

AJAX ENGINEERING DIVISION
Trenton 7, New Jersey

SUPERFLUID WELDING, PLATING—Molten metal rapidly cooled below its freezing point becomes superfluid instead of solidifying. Prof. Rintaro Takahashi of the Chiba Institute of Technology, Japan, is suggesting to Japanese industrialists that they make use of the discovery. The process can utilize practically any metal (including tungsten and lead) to plate or weld any solid.

DEVELOP OUTSIZE RECTIFIER—Joint efforts of Alcoa and Westinghouse have produced a 312 cell silicon rectifier which delivers 6000 kilowatts at a 10,000 ampere rating. Such devices are finding wide application in heavy industry, particularly smelting, says Aluminum Co. of America, Pittsburgh.

TUNGSTEN PLATINGS—Vapor deposition can deposit relatively pure tungsten coatings on metals, point out representatives of the National Bureau of Standards, Washington. The bureau's process may hold the key to forming some exceptionally complex tungsten shapes.

DO-IT-YOURSELF CHROME PLATE—A new method for putting a diffused chromium layer on steel surfaces is said to offer processors a chance to plate in a heat treating shop. The chromium increases resistance to wear and corrosion. Details will be released shortly.

ANOTHER HOT ALLOY—WI-52, containing 13 per cent tungsten, works well in jet engine components operating at 1750° F, says Stanford Research Institute, Menlo Park, Calif. Coatings of chromium and aluminum help offset oxidation.

PLASTIC TOOLS GROWING—"Plastics are becoming more and more important to the tooling industry," says L. L. Linzell, technical assistant, Stamping Div., Chrysler Corp., Detroit. His company promotes efficient use of plastic tooling with a rigid set of standards and methods based on its experience.

LIGHTER STRUCTURES—Design your product to take advantage of steel's tensile properties, not its compressive strength, advises Designer R. Buckminster Fuller. He claims towers and buildings built with that principle can be lighter, stronger, and cheaper than conventional structures.

STRENGTHENS WIRE—Electropolishing increases the ultimate strength of stainless wire 37 per cent, claims Southern Research Institute, Birmingham. The change was noticed during tests of methods to make tapered lengths of wire.

QUICKIE METAL ANALYSIS—Fast calculation of creep and time-to-rupture of high temperature alloys can be done by analyzing changes which take place in the 20 per cent range between the melting point and absolute zero, claim researchers at Union Carbide Metals Co., a division of Union Carbide Corp., Niagara Falls, N. Y. Results are said to be accurate. They also indicate that creep and diffusion may be related.

MOLTEN PUMP WEAR—Smaller, less expensive liquid metal pumps are being developed at the Research Institute, University of Michigan, Ann Arbor, Mich. Present temperature limits of 1500° F may also be extended considerably if erosion and cavitation problems can be licked.

CHEAPER REFRACTORY ALLOYS—A new alloying process utilizing metal oxides, inert atmosphere, flux, and an electric arc promises to be cheapest way yet to make refractory alloys like titanium, molybdenum, or chromium, claims Alscope Explorations Ltd., Passaic, N. J.

Ultrasonic Welding Can Improve Joints in Dissimilar Metals

	ALUMINUM	COPPER	GOLD	KOVAR	NICKEL	PLATINUM	STEEL
ALUMINUM	✔	✔	✔	✔	✔	✔	✔
COPPER		✔	✔	✔	✔	✔	✔
GOLD			✔	✔	✔	✔	
KOVAR				✔	✔	✔	
NICKEL					✔	✔	✔
PLATINUM						✔	✔
STEEL							✔

Blank spaces do not mean that such combinations are impossible—they've not been attempted so far. Elements listed include alloys

Many hard to handle combinations are mated readily in one of these machines. Only light gages are being joined now but promise is held out for heavy gages and larger equipment

DISSIMILAR metals, hard to handle by conventional methods, are being joined effectively and consistently by the latest ultrasonic techniques.

Participants at a technical conference of the American Welding Society also learned that such junctions are free of interdiffusion, intermetallic compounds, and the brittleness which is so often present.

Metals handled so far include many of those which are of major interest to builders of aircraft, missiles, rockets, and nuclear reactors. Included: Titanium, zirconium, molybdenum, and the precipitation hardening stainless steels. Applications are in structural, electronic, and electrical fields—good joints are being made right through insulation.

• Material thicknesses are limited by power handling capacity of present equipment. Newer developments are on the way which will permit heavier, thicker sections to be joined in a wider variety of shapes, says W. C. Potthoff, vice president, Aeroprojects Inc., West Chester, Pa.

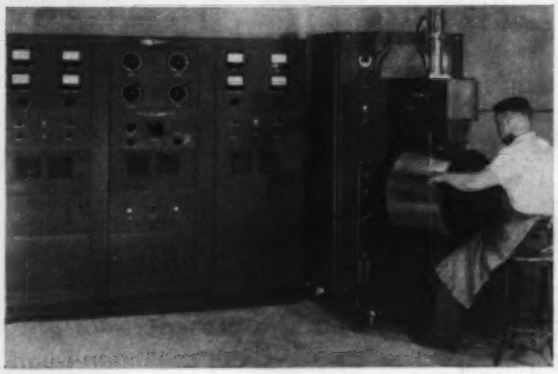
Restrictions apply only to the thinnest member (one may be a heavy block) and depend on physical and metallurgical properties of the materials. Such joining is also restricted by differences in hardness of metals at the interface (it is difficult to handle a soft and a hard metal in one joint).

Aluminum and copper up to 0.100 in. are handled, as are 0.040 in. titanium and zirconium alloys.

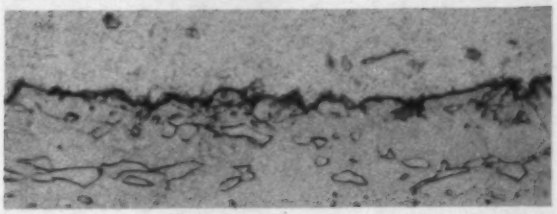
Mr. Potthoff points out that ultrasonic, single spotwelds are quite strong and that users can reproduce results usually within 10 per cent of an average value established by experience.

An interesting feature of such joints is that they frequently exceed the required military specifications for joints made in the weaker of two being welded. For example, if you fasten 0.040 in. 3003-H14 aluminum to 0.028 in. AM-350 stainless, you'll get a shear strength of about 700 lb, states Mr. Potthoff. The military requirements for a joint made of the aluminum only is only 375 lb—slightly more than half. As a result, Mr. Potthoff feels that military specifications will have

This is the big of it, and the little. The 100 watt machine joins miniature components. The 4000 watt job can make joints in 0.100 in. aluminum in about 1 second

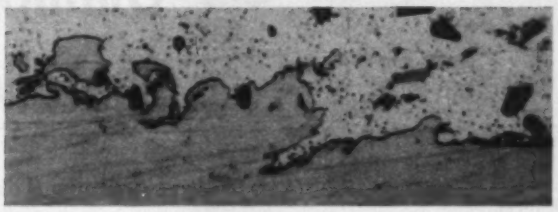


Some photomicrographs of ultrasonic bonds illustrate the diffusion obtained between dissimilar metals—3003 aluminum to AM-350 stainless; AISI 430 to A-110AT titanium; and aluminum wire to copper



Electrolytic oxalic etch X 670

HF and HNO_3 etch X 150



0.5 per cent HF X 900

to be developed to cover ultrasonic welds. At present, the one for resistance welds is a guide.

• Interleaf welding sometimes helps the joining of two dissimilar metals.

Aeroprojects has found that a sandwich of stainless, molybdenum, and zirconium can be more easily joined by using separators of aluminum. Foil is thinned about 80 per cent in the bond area and about 5 per cent elsewhere. Its role in the bonding mechanism isn't clear, but such interleafing is beneficial: It extends the range of weldable sheet gages, permits welding at lower power or shorter times.

Junctions between aluminum, silver, and copper have long been a problem in the electrical field. With ultrasonic methods, good joints are being made without removing the insulation. Conductivity is comparable to that achieved by conventional methods. It is particularly useful, say electronic people, for attaching lead wires to silicon transistors and microscopic wires to electric match components. Mr. Potthoff says welding leads to metallized glass circuit boards looks quite promising.

• Ultrasonic welding is not a substitute for conventional methods. It is a supplementary process to be used where other methods are impractical, unreliable, or too expensive. Briefly, here's how it works.

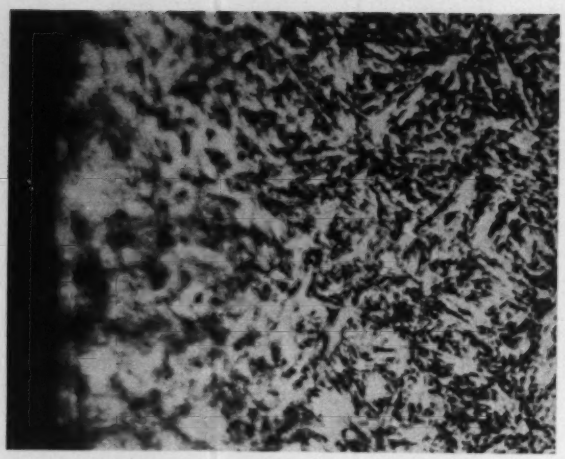
Vibration is introduced in a joint area by a device that converts high frequency electrical power to mechanical power. Parts are clamped together during vibration periods. Clamping produces spotwelds, overlapwelds, and continuous seamwelds with a roller tip.

Frequencies run from 15 to 60 kilocycles per second, the lower range being used for the higher powered equipment. Welders look like resistance machines. They're simple to operate, claims Mr. Potthoff.

Searching into the mechanics of ultrasonic welding has so far revealed that rapid stress reversals parallel to the interface break up and disperse surface films in the weld area. That is accompanied by some plastic deformation and interpenetration although the thickness is seldom reduced more than 5 per cent.

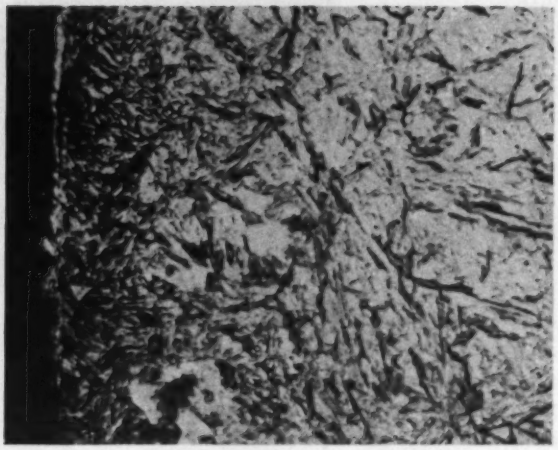
The ultrasonic welding does produce a little heat but no fusion. Temperature rise can be controlled closely. The localized heating does promote plastic flow which increases the bond properties.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.



Etch: Picral. X1000

CONVENTIONAL ABRASIVE methods produced edge rounding on this martensitic medium carbon steel

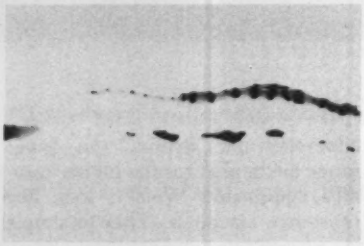


Etch: Picral. X1000

DIAMOND ABRASIVE process on martensitic medium carbon steel shows flatness of field

Unetched. X100

MANGANESE-SILICATE INCLUSIONS in steel sharply defined, intact



Unetched. X250

FLAKE GRAPHITE IN CAST IRON shows hard and soft constituents

Diamond Abrasive Eases Metallographer's Task

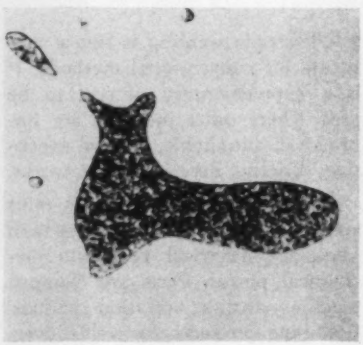
Carefully sized abrasive is key step in a procedure for preparing metallographic specimens worked out at Pitman-Dunn Laboratories, Frankford Arsenal. It prevents edge rounding, retains nonmetallic inclusions, cuts surface distortion

DIAMONDS may be a girl's best friend, but they can also be a real help to the metallographer attempting to obtain the true picture of complex structures, says E. C. Olden of the Pitman-Dunn Laboratories Group, Frankford Arsenal, Philadelphia. The use of carefully sized diamond powder is the key step in producing metallographic specimens which combine superior flatness with the retention of inclusions and preservation of the original form of the metal's structure.

• **Brings Out Details**—A common problem in preparing samples for examination under the metallographic microscope is the tendency for inclusions to "smear" or "tear"

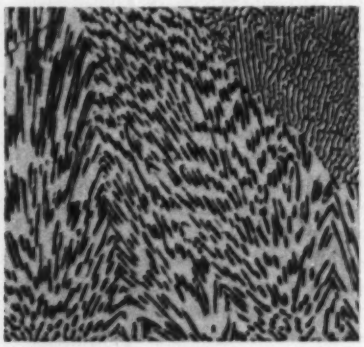
Etch: Picral. X1000

LAMELLAR PEARLITE in medium carbon shows lack of surface distortion



Unetched. X250

LEADED BRASS is polished without surface disturbance



Etch: Acidified chromate-chloride. X100

SILVER-COPPER as cast exhibits clear details, no smearing

in polishing, making their identification difficult. The "comet tails" which show that an inclusion has been removed also destroy the original shape of the particles.

Soft metals, in particular, are subject to surface disturbances in polishing, which may work the alloy sufficiently to give a false idea of its condition. The observer is then faced with the problem of deciding how much of the working observed was present in the original sample, and how much was introduced during preparation.

Varying hardness also presents problems. Softer areas, while they may remain flat, tend to have more material removed than do harder portions. Thus there may be more than one plane in the polished specimen, making it difficult or impossible to focus the entire field. The softer mounting material holding the specimen contributes to edge rounding, adding to the problem of observing or photographing surface phenomena. If a small amount of surface change has occurred, it may be missed if the rounding is appreciable; surface reactions are important for such problems as carburization, decarburization, oxidation, nitriding, or even plated films.

The new method preserves structures, surfaces, and inclusions; it presents hard and soft areas in the same plane for examination or photography.

• **How It's Done**—One advantage of the method is applicability to hard or soft samples without changing the basic procedure; key to the process is diamond polishing following the intermediate steps.

Samples were prepared by clamping, or by mounting in Bakelite or Lucite plastic, and rough polished by using 1 G silicon carbide speed wet paper, followed by a similar 400 grit paper.

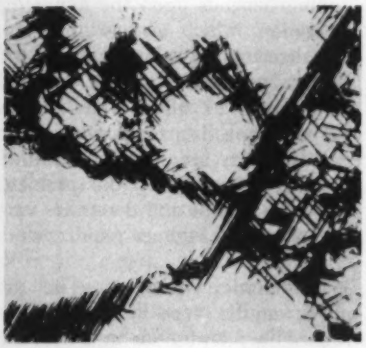
During all polishing operations, specimens were turned 90 degrees after each step, so that removal of scratches from the preceding stage could be observed.

Intermediate polish, developed after first experimenting with lead laps, employs a spiral cut, wax wheel rotating at 360 rpm and using a 600 grit, paste type, silicon carbide abrasive.

Diamond polishing, the next phase, was carried out in two steps. A low nap Gamal cloth was used on standard 8 in. wheels rotating at 600 rpm. The coarser diamond paste used was 5 to 8 microns, the finer was 0 to 1 micron in diameter. Paste was charged at the center of the cloth. Cutting speed increased for the first hour that the wheels were used after charging, then reached a steady rate.

A final polish removed the superficial scratches resulting from the diamond polishing. It followed conventional practices, using an 8 in. wheel with a low nap Gamal cloth, rotating at 600 rpm. Abrasive was magnesium oxide for nonferrous materials, levigated alumina for ferrous alloys.

Time for preparation of samples by this method did not exceed 30 minutes. Specimens, as shown by the illustrations, showed excellent flatness in samples of nonuniform hardness as well as at edges; inclusions are not removed; even on materials which have an easily disturbed surface, a single polish-etch cycle usually sufficed.



Etch: Acidified chromate-chloride. X250

COPPER-TITANIUM wrought material demonstrates surface excellence

Etch: Keller's. X500

ALUMINUM-COPPER as cast allows identification of phases

Cracking Test Fast

Simple procedure developed for stainless, other alloys. It also predicts tear susceptibility

A FAST, simple, and inexpensive test predicts hot cracking susceptibility of stainless steel and other alloys, reports Westinghouse Electric Corp., Pittsburgh.

Hot cracking occurs under the heat and stress of welding, or tear when freezing out from the molten state as a casting.

It may take place in welding large, thick walled stainless steel piping for steam turbines, chemical plant components, or other structures which must operate under conditions of high temperature and pressure, comments Dr. Clarence Zener, director, Westinghouse Research Laboratories.

• **Relationship Noted**—Dr. F. C. Hull, metallurgist and inventor of the test, noted that the tearing of a casting as it cools and shrinks is comparable to the cracking of a weld as it freezes. Therefore, the study of a small metal casting is equivalent to the study of welds in a large sample of metal.

• **Procedure**—The casting is prepared by a process called levitation melting. A 20 gram sample is melted in 10 or 15 seconds in a protective atmosphere of argon. The sample floats inside a coil supported in space by a magnetic field induced by a high frequency current.

The current is cut and the metal drops into a copper mold to form a tapered pin about 2 in. long and ¼ in. in diameter.

The top and the bottom lock in place to prevent normal contraction in the mold.

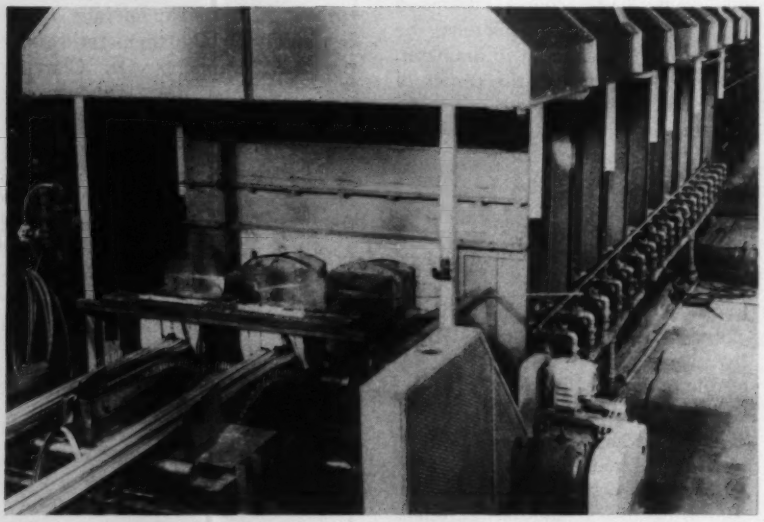
Tensile stresses, caused by shrinking and cooling, tend to make the metal tear apart. The longer and slimmer the pin, the greater the tearing.

A scale for evaluating alloys of different composition is built up to describe the hot cracking susceptibility numerically.

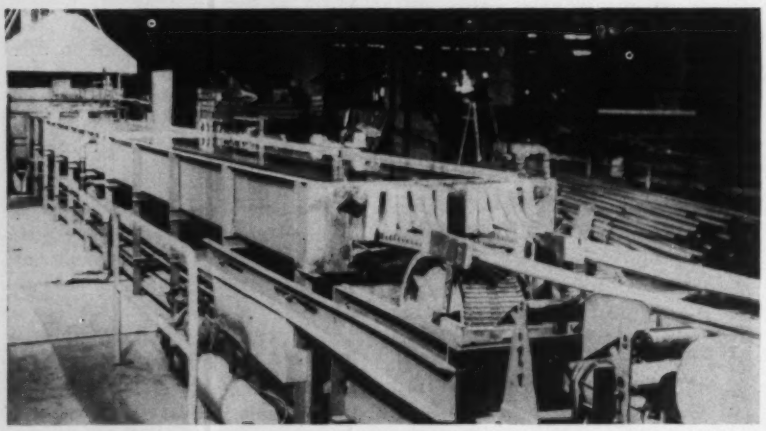
The cast pin tear (CPT) test, as it is called, has been used more than 3700 times on various alloys.

Atmosphere Furnace Automates Stainless Tube Annealing

Gas fired unit with twin Inconel muffles carries out processing automatically after charging. Assembly and testing before shipment cut installation time



Charge end of furnace shows tubing entering the twin muffles over vulcanized drive drums. The guard edge on the belt maintains the tubing in position



Discharge end and water cooling section of Sunbeam furnace at Trent Tube Co. Based on a 20° F temperature rise, unit requires 50 gallons per minute of cooling water. Pneumatic cylinders maintain belt tension

STAINLESS steel tubing is bright annealed in an automated atmosphere furnace at the plant of Trent Tube Co., East Troy, Wis.

To simplify installation, the 85 ft long unit was completely assembled at the plant of the manufacturer, Sunbeam Equipment Corp., Meadville, Pa. Shipping the pretested equipment as a unit reduced the time required to place the furnace in operation after installation.

• **Starts with Strip**—Fed from coils, the stainless steel strip is continuously formed into a tube. The patented Contour Trentweld process makes the weld, also continuously, while the seam is at the bottom of the tube. Gravity curves the molten weld metal in about the same curvature as the tubing wall, to eliminate the formation of a weld bead or undercut on the inside of the completed tube. After welding, the pipe or tubing is cold worked further by drawing, swaging, or other methods. The cold working removes the outside bead and breaks up the cast structure of the weldment so the metallurgical structure after annealing is more uniform.

Control of the hardness, tensile strength, and final grain size of the tubing depends upon the annealing operation, which also is important in determining the final finish. Proper processing in the previous steps loses its effectiveness if the correct annealing temperatures and atmospheres are not maintained. Further complicating the problem, the tube lengths and diameters vary according to customer requirements.

• **Automatic Operation**—The gas fired, muffle type furnace is designed for continuous and automatic operation. After the tubing has been placed on the charge table, it passes through the heating and

cooling zones of the unit without further human manipulation. Maximum temperature is 2100° F, maximum tubing diameter is 4 in.

Heating rate is 400 to 700 lb per hour, depending on the diameter, wall thickness, and analysis of the tubing being processed. Effective heating space in the furnace, which has an over-all cross section of 6 ft wide by 7½ ft high, is contained in twin Inconel muffles, each 13 in. wide by 22½ ft long and with a height of 7 in. between the top of the muffle and a woven belt which moves the tubing through the heat treating cycle.

The muffles protect the work through both heating and cooling cycles. Constructed in a D shape, the muffles are made of ¼ in. plate. In the heating area, they are supported on refractory slabs that rest on firebrick piers.

The woven belts which carry the work through the muffles are of a chromium-nickel alloy, rod reinforced, and have 2 in. high guard edges. Beneath the belt in each heating chamber is a series of alloy rollers built into an alloy frame. The frame is fixed at the charge end of the muffle and can be removed as a unit for maintenance.

• **Adjustable Drive**—Drives for the belts are separate, vulcanized drums mounted on a single shaft at the charge end of the furnace. A ¾ hp motor powers the belts through a variable speed drive, to add to the furnace flexibility.

The cooling chamber (50 ft long) is of welded steel plates. It is water jacketed for faster heat removal. Asbestos flame curtains burn off any escaping atmosphere at the ends of the unit.

The furnace is underfired by 18 burners on each side; gases are exhausted through overhead ductwork. Two Leeds & Northrup strip chart recording controllers, one for each zone, hold the required temperatures, and an excess temperature indicator controller is provided.

After bright annealing, further processing may include drawing, straightening, polishing, and cutting to length. Prior to shipment to warehouse or customer, quality control approval is required. Tests may include x-ray inspection for flaws.

Electric leads to a varied assortment of thermoelectric units are being attached here. The cooling devices are useful in industrial and military applications including the electronic systems in rockets and missiles

Thermoelectric Cooling Hits Commercial Stride

A LINE of thermoelectronic modules for cooling industrial and military electronic equipment is being produced by Westinghouse Electric Corp., Pittsburgh, in commercial quantities.

The modules are mounted with transistors, diodes, and other electrical components where compactness, silent operation, and controlled cooling are desired. Without moving parts, they refrigerate local areas which present heat dissipation problems resulting from compact design.

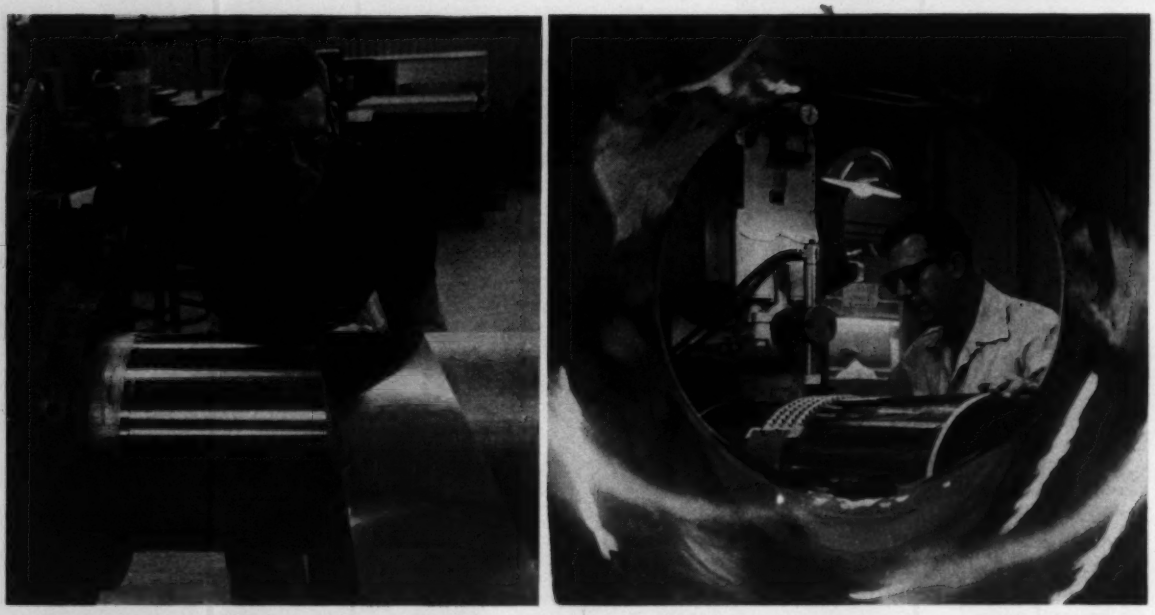
Heat removal depends on the temperature difference between the hot and cold surface of the cooler and on the power input of the unit. Example: A type WX 816 module can maintain a temperature differential of 77° F with a heat load of more than 17 Btu per hour, reports Westinghouse.

The modules permit operating the electronic equipment in higher ambient temperatures and reduce failures caused by poor local heat dissipation.

Present heat dissipation devices that use ambient air limit the temperature rise of the components above ambient temperatures; they cannot, however, cool below the surrounding atmosphere.

Existing techniques are ineffective in controlling heat generated by certain components in concentrated areas. The results are "hot spots" caused by the rising temperatures.

"The need for an efficient electronic component cooler stems from the rapidly changing electronic field itself," says D. W. Gunther, manager of the Semiconductor Dept. "Space, weight, and operating temperatures are critical requirements when considering the electronic control or guidance equipment of new aircraft and proposed unmanned vehicles . . ."



Superstrength steel, tissue thin, spirals slowly onto a mandrel where it's spot-welded. Gleaming interior of finished chamber frames operator stitching a new case together

Wrap Method Strengthens Rocket Chambers

Foil-thin stainless is wrapped onto a mandrel and spotwelded to form cylinders which resist 305,000 psi and high temperatures of solid propellents

PAPER-THIN steel and precision spotwelding are features of a technique that is responsible for a tough new line of rocket chambers.

Ryan Aeronautical Co., San Diego, Calif., winds foil-thin strips into multiple layers which are spotwelded into cylinders. They take stresses up to 305,000 psi—far greater than those held by solid wall cylinders. Early tests were on quarter-scale rocket motors, but the later results on full scale motors indicate that the technique can be used on a wide variety of missiles. (Ryan will patent the method.)

• Obtaining such strength required the reduction of stress concentration around spotwelds.

Ryan engineers can spotweld up to 20 layers of foil. The new techniques have overcome a major hurdle: Attaching end closures of Armco 17-7 PH stainless steel.

Spotwelding appears to be the best way of holding the explosive forces in rocket motors. Two other methods have been tried: Brazing, which introduces extra weight and weakens the parent metal and resin bonding, which can separate under aerodynamic heat.

• An intensive search for a material which would meet all conditions led to the adoption of the AM 355 series of alloys.

Metals tested included Armco 17-7 PH, Armco PH 15-7 Mo, 301 extra full hard, HE 25, and the AM 355 (subzero cooled, cold rolled and tempered, in both 30 and 70 per cent reduced types).

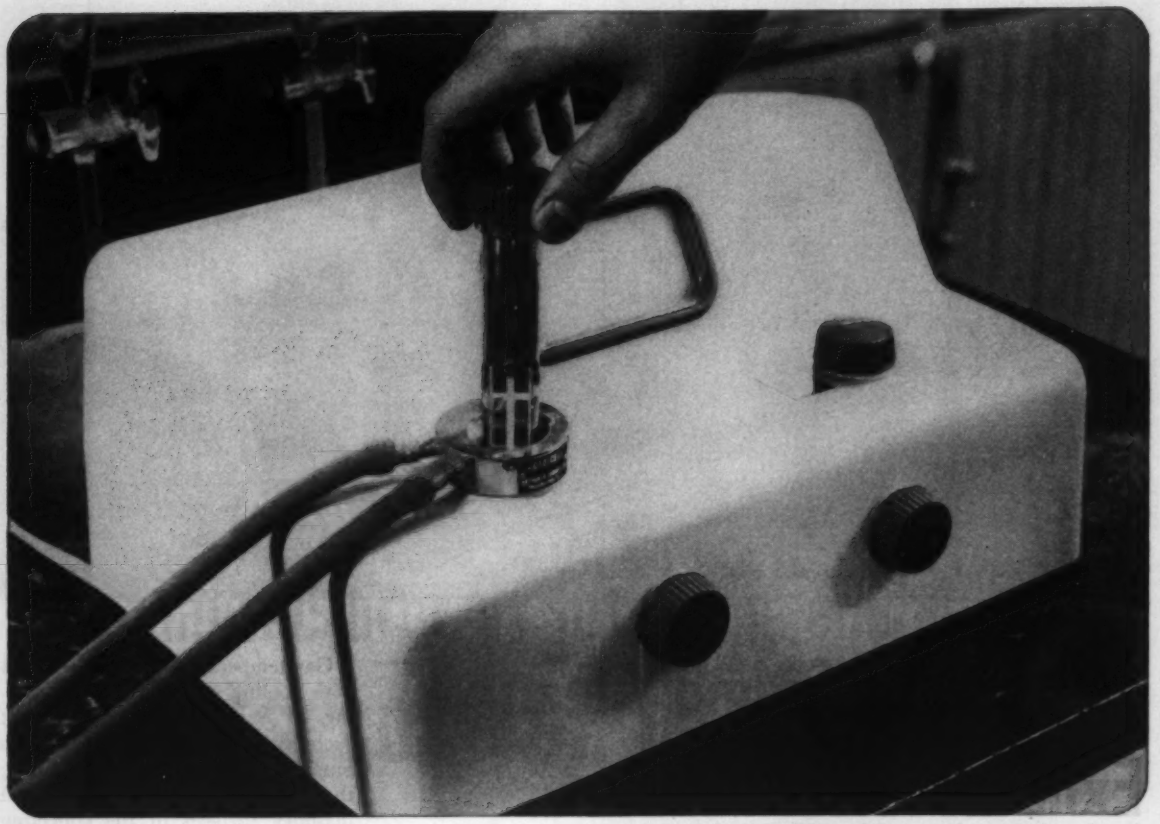
Two-ply spotwelded specimens 0.3 to 0.75 in. wide were made from each alloy. The number of welds varied from one at the center to overlapping spots clear across the piece. Tests included parent metal yield and ultimate strength; Young's modulus and percentage elongation; ultimate strength reduction due to spotwelding; and a strength-weight comparison.

Tensile tests, by themselves, were not enough to warrant elimination of any metal so other tests were tried. Tear results were inconclusive, since all alloys tore in a straight line and required about the same amount of force. A drop ball impact test helped to determine the relative ductility of the alloys. Brittle fracture tests were also made. AM 355 (subzero, cold rolled and tempered, 30 per cent cold reduced) absorbed the most energy prior to failure.

W. E. Clark and L. E. Leech, Ryan engineers, say, "We are looking for ways to raise the 300,000 psi ultimate tensile strength of our laminated cylinders. Our search centers around improving welding techniques, including electrode shape and material, current density and wave shape, and weld nugget size."

Ryan also expects to use a titanium alloy to build some chambers.

***Experience**—the added alloy in **Allegheny Ludlum** tool steels*



COLORIMETER (inherently extremely accurate) determines percentages of molybdenum, tungsten, cobalt and manganese in A-L tool steel to insure consistent, high quality.

Colorimeter measures exact chemical composition of Allegheny Ludlum tool steel melts

Accurate adjustment of alloys guarantees uniform heat treatment, predictable dimensional changes, reduced grinding, standardized machining operations.

Close control of molybdenum, tungsten, cobalt and manganese is at the heart of a good tool steel melt. In addition to the usual testing methods, Allegheny Ludlum's chemical laboratory checks these metals with Colorimetry because of its inherent, extreme accuracy.

On the basis of the Colorimeter's findings, it is possible to make carefully calculated furnace additions of ferro-alloys, insuring precise control over chemistry. This guarantees your receiving the *exact* analysis order after order, providing *uniformity of heat treatment, predictable dimensional changes, reduced grinding and standardized machining operations.*

Colorimetry is but one step toward careful control over composition. Allegheny Ludlum also sets exacting purchasing specifications on raw materials and scrap. Quality Control checks all incoming orders to see that they conform with these specifications. Another guard toward your getting your exact specifications: each ingot bears a metal tab showing heat number.

Allegheny Ludlum stocks a complete line of tool steel sizes and grades. Call your nearest A-L representative; you'll get quick service and counsel on such problems as heat treating, machining, grade selection, etc. Or write for A-L's publication list which gives full data on the more than 125 technical publications offered. They'll make your job easier.

ALLEGHENY LUDLUM STEEL CORPORATION, Oliver Bldg., Pittsburgh 22, Pa. Address Dept. S-26

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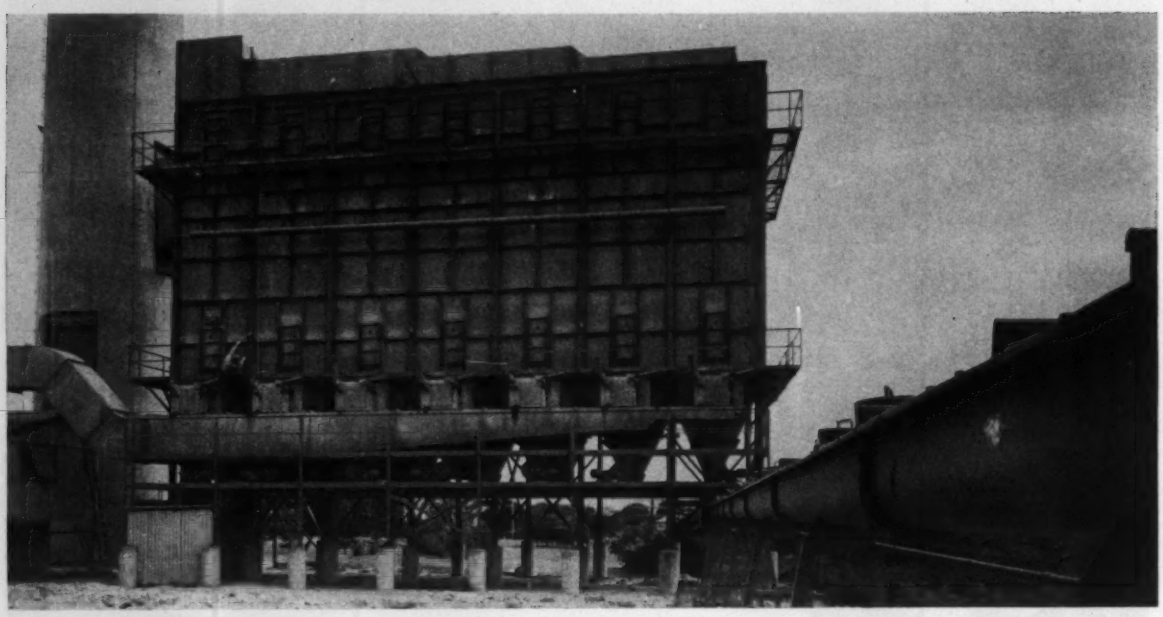
ALLEGHENY LUDLUM

Tool Steel warehouse stocks throughout the country... Check the yellow pages

every grade of tool steel... every help in using it



Swing and Sound Clean Exhaust Gas Filters

Four Ways to Clean Filter Bags:

Swinging
Makes gentle waves in sides of filter, shaking loose light, fluffy material.

Sound
Low, audible vibrations remove heavy dust, don't damage delicate filters.

Reverse Air Flow
Air stream doesn't provide enough agitation to clean the filter bags.

Shaking
Vigorous whipping breaks delicate fibers in high temperature filters.

ONE WAY steelmakers can meet rigid antipollution requirements and save valuable materials with dry filter systems: Use high temperature filter bags and the right cleaning methods.

Gentle swinging or vibrations produced by audible sound generators will permit use of glass bags in filter systems that handle hot furnace exhaust gases. Dracco Div., Fuller Co., Cleveland, supplies systems using either cleaning method.

• Gases from metal melting are too hot for conventional filter materials, and water cooling is costly.

Valuable byproducts in exhaust gases make filtering economically desirable. And management is interested in efficient dust control to prevent air pollution, reduce plant maintenance costs, and improve product purity.

Several types of dust collecting systems have been developed. One of them, the bag type filter, offers high collecting efficiency, but conventional filter fabrics can't take the hot, corrosive conditions found in metallurgical operations. Synthetic fibers are better, but Dracco doesn't recommend them for temperatures above 250° F.

Gas temperatures can be reduced with cooling tubes to permit filtering in synthetic fiber bags, but such cooling is expensive. Too much cooling causes condensation; that leads to corrosion of metal and masonry surfaces in the collecting system.

• Glass fiber filters can take high temperatures, but gentle cleaning methods must be used to prevent breakage.

Dracco engineers considered glass fiber as a filter medium as early as 1940. The material has the corrosion and heat resistance needed to collect dust in metallurgical applications. But low flexural strength cuts filter life in systems cleaned with mechanical shakers.

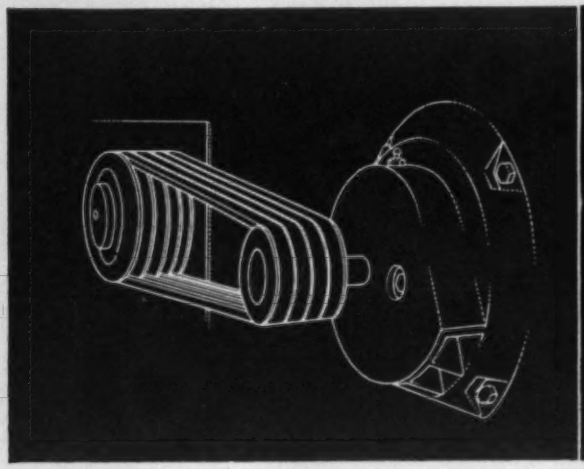
The company considered special treatment of fabrics, proper placing and spacing of bags in compartments, and bag tension in developing suitable glass bags. Major problem: Perfection of agitating methods that would remove dust from the bags without breaking them.

• Swing action removes light, fluffy material from the bags; sound vibrations are better for heavier dust.

The company perfected two devices for glass filter cleaning. One, called Swing-Clean, is a mechanical setup that gently oscillates the tops

BEFORE: This drawing of the former 4-belt drive on a clothes pressing unit is in the same scale as the photo of new Super HC V-Belt Drive at right. Heavy sheaves needed for 4 belts imposed high bearing loads.

AFTER: By redesigning the drive for Gates Super HC V-Belts only 3 belts are required and this Utah manufacturer saves 16 pounds in weight and 24% on the drive cost of every pressing unit it makes.



Manufacturer of pressing equipment cuts cost of drives 24%

New high capacity V-belt also saves weight and space!

This manufacturer is just one of many who have already turned to Gates Super HC V-Belts to achieve far more compact, lighter weight, lower cost V-belt drives for all types of machines. With new Super HC V-Belts, sheave dimensions can be reduced 30% to 50%, overall space up to 50%, and drive weight by 20% and more.

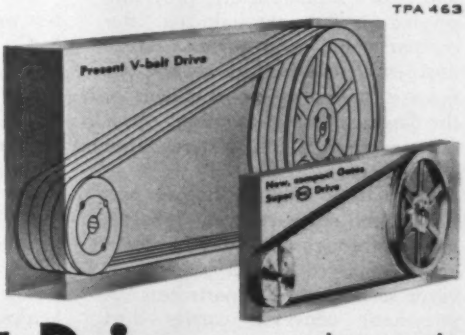
A product of Specialized Research in the world's largest V-belt laboratories at Gates, the Super HC V-Belt Drive is already standard equipment on production models in virtually every industry.

Engineering Service Nation-Wide

Whatever your plant's power transmission design problem, wherever you are, your nearby Gates Distributor or Field Representative is ready to assist you to cut space, weight, and costs with Super HC. Ask him for a copy of *"The Modern Way to Design Multiple V-Belt Drives."*

TPA 463

The Gates Rubber Company, Denver, Colorado
Gates Rubber of Canada Ltd., Brantford, Ontario



Gates *World's Largest Maker of V-Belts*

Gates Super HC V-Belt Drives same hp capacity in smaller "package"

of the bags, instead of shaking or whipping them. Undulations in the sides of the bags cause dust to drop.

Another device, called Sonoclean, uses sound generators to produce low audible sound, which causes the bags to vibrate. Bag motion can be felt, but it isn't visible. Noise level is not objectionable outside the filter compartment; it isn't heard often, because of other plant noises.

• Successful application of glass bags and swing cleaning in copper smelting brightens prospects for use in steelmaking.

Reverberatory furnace and converter gases are handled at Hudson Bay Mining & Smelting Co. Ltd., Flin Flon, Man., by a 450,000 cfm filter setup. The system has twelve 10-compartment filters and collects over 35 tons of material a day.

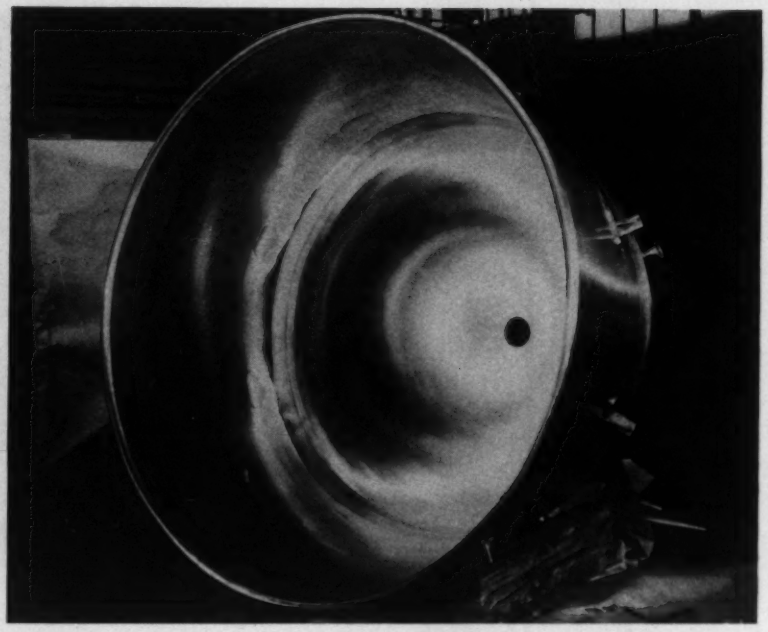
Exhaust gases are blown to a series of cooling tubes, where temperature is cut from 800 to 450° F. That is 100° F less than the recommended maximum for glass bags. Use of glass filter material permits use of smaller cooling facilities, costing half as much as those needed for conventional bags.

Many of the bags at Hudson Bay Mining & Smelting are over two years old. Glass cloth filters are responsible for the success of the company's dust collection program, says D. J. Robertson, superintendent of research.

• An automated cleaning cycle makes for uniform filtering; solids are carried away by pneumatic conveyor.

Air operated valves are opened and closed automatically, providing reverse air flow through the filter compartments, in sequence. Some dust isn't removed by reverse air flow; it builds up on the sides of the bags. Swing cleaning, about once every 8 hours, restores filter effectiveness.

Dust drops into the hopper bottom of the compartment. It is removed through rotary gate locks and discharged into a screw conveyor serving ten compartments. A pneumatic conveyor carries dust from all 12 filters to a processing station 500 ft away, where metals are extracted.



Titanium kettle of 250 gallon capacity is shown during fabrication. Kettle was then placed in use for 4000 hour test under severe corrosion conditions

Success of Corrosion Test Widens Field for Titanium

A 250 GALLON titanium cooking kettle emerged corrosionfree from a 4000 hour food preparation and service test conducted by H. J. Heinz Co., Pittsburgh. Significance: It opens up a vast potential market for titanium in civilian applications.

Co-operating with Heinz in the test were: E. I. du Pont de Nemours & Co., Wilmington, Del. (supplier of titanium sponge); Republic Steel Corp., Cleveland (supplier of RS-55 and RS-70 rolled sheets); and B. H. Hubbert & Son Inc., Baltimore (fabricator).

• Resists Acids, Alkalies—The test included half a dozen food varieties which seriously corrode and pit nickel alloy and stainless steel kettles. While those steels provide corrosionfree service in nearly all food processing situations, they are affected by solutions containing sodium chloride (salt) and acetic acid (vinegar).

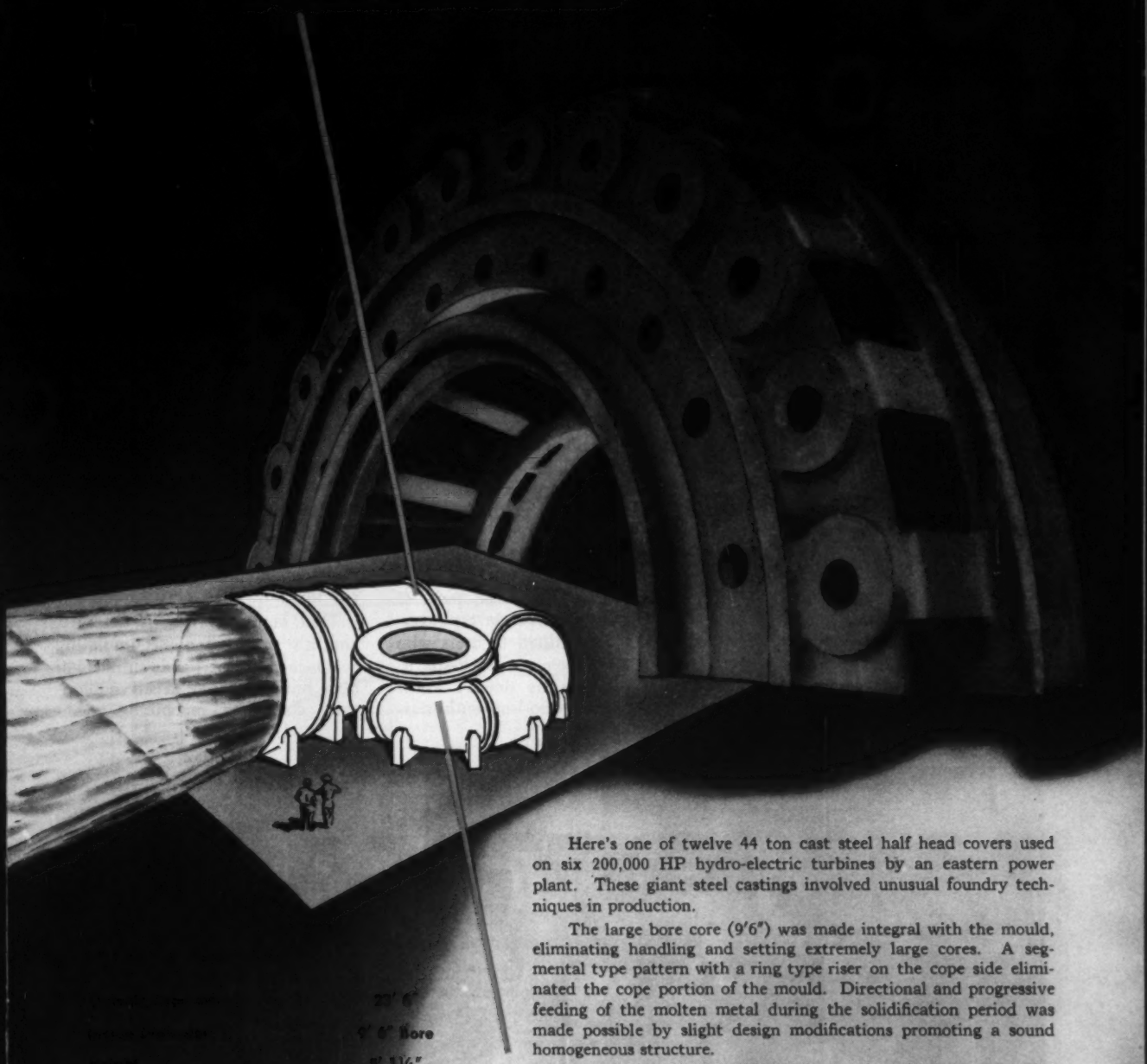
After the cooking test and more than 300 cleanings using various alkaline cleaners or scouring powders, Heinz reports the kettle emerged bright and free of signs of attack.

• Fabrication—The kettle was deep drawn by the Hubbert firm. Normally a vessel like this is made from a seamless, deep drawn section or from welded, orange peel shape segments.

The inner shell is a 45 in. diameter hemisphere drawn from 0.178 in. thick sheet (RS-55); the outer shell is a similar shape drawn from a 0.125 in. sheet (RS-70).

The inner sheet was drawn to a total depth of 21 in. in four stages; the outer sheet was formed to a depth of 23 in. in six stages. Estimated drawing temperatures were 500 to 600° F.

Cast Steel Harness for 200,000 Horses



	27' 6"
	9' 6" Bore
	5' 1¼"
	88,510 Lbs.
	93,000 Lbs.
	181,510 Lbs.

Here's one of twelve 44 ton cast steel half head covers used on six 200,000 HP hydro-electric turbines by an eastern power plant. These giant steel castings involved unusual foundry techniques in production.

The large bore core (9'6") was made integral with the mould, eliminating handling and setting extremely large cores. A segmental type pattern with a ring type riser on the cope side eliminated the cope portion of the mould. Directional and progressive feeding of the molten metal during the solidification period was made possible by slight design modifications promoting a sound homogeneous structure.

After stripping, the castings were subjected to hydro-blasting and arc-air method for excavating surface imperfections. Finally, rigid dimensional inspection was followed by magnetic particle and radiographic examination at critical areas.

Here, at Erie Forge & Steel, experienced engineers, metallurgists and craftsmen control quality every step of the way from raw materials to finished steel casting. Consult with us on your steel casting and forging requirements.

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Tape Control Will Capture Lion's Share of Drill Jobs

Machine tool builder feels 1960 is destined to be a boom year for numerical control. He bases his estimate partially on a wave of user enthusiasm

"BY THE end of 1960, numerically controlled machines should account for as much as 70 per cent of the new drilling and boring machines being bought."

Explaining that prediction, Frank J. Fields, president, Fosdick Machine Tool Co., Cincinnati, says that tape control has been sold to industry on its merits. "It has been sold as a concept."

Some prospects still are hesitant about their ability to maintain complex control equipment, but Mr. Fields feels the machine tool and control industry has gone a long way toward minimizing the problem.

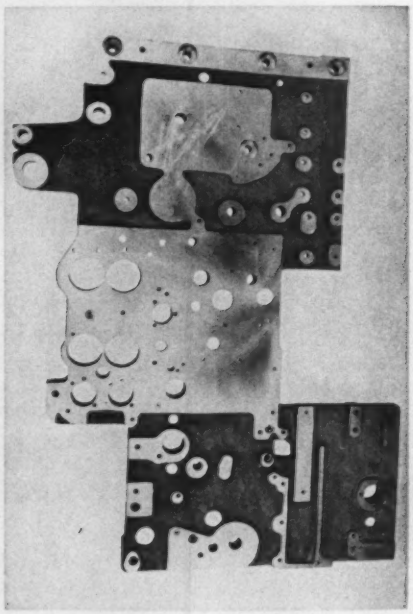
About his company's numerical system, he says: "We have reached the point where our control can be understood by average maintenance personnel. Today, the user need expect no more trouble with tape control than with standard machine control systems, and that includes the job of getting the machine set up and started in production."

• **Testimonials**—At least part of the forthcoming boom in tape control must be credited to users who shout about their success with it. Mr. Fields says he doesn't know of a single user who isn't enthusiastic about it. "Our customers have averaged roughly a 400 per cent production increase on the jobs they've converted to tape. In addition, they have eliminated nearly all the chances for error in the operations."

A couple of weeks ago, an electronic equipment builder took an intricate housing sideframe to Fosdick for tape control analysis. Including drilling of 167 holes in the part, 441 operations are required. Without tape control, that requires 35 hours.

Fosdick engineers studied the part, and programed a tape to run it on a machine in a demonstration room. With tape, the part was completed in 7½ hours. With the addition of a depth control system, the whole machine cycle could be made automatic, and the engineers say they could cut the time to about 6 hours. Addition of automatic tool change, they feel, could cut the time to 4 or 5 hours.

That kind of saving is not rare, and it's the kind of accumulating evidence that Mr. Fields thinks will help build a boom in all numerically controlled machining.



As the operator watches, a numerically controlled jig boring machine performs 441 operations on 167 holes. Tape control reduced the time for this job from 35 to 7½ hours, and it can be cut further

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X-ray Gains in Process Control

List of potential in-line applications grows with advent of more efficient, less costly equipment, utilizing new techniques. Major promise: Reduction in rejects

INDUSTRY experts have been predicting a boom in x-ray.

In part, their optimism can be attributed to new advances in construction which make equipment more rugged and more accurate than ever on regular production lines.

Leaders in the upsurge include the x-ray spectrometer (for fast metal analysis), transistorized thickness gage (it provides a continuous check of strip thickness in a mill), and a recent major improvement called an emission gage (it will continuously check raw materials going into a process).

• Here are several case histories which illustrate the trends and the kinds of jobs the newer x-ray devices can do.

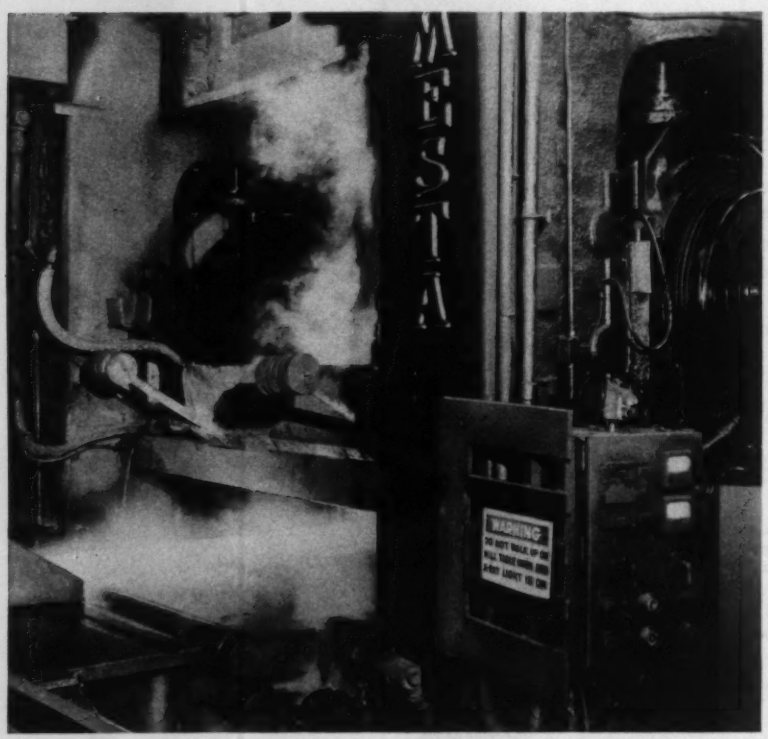
At a major midwestern mill, steel was running through furnaces and strip mill in what seemed to be good order. Several heats later, the laboratory found excessive sulfur. The result: A major loss to scrap.

That could have been prevented by an industrial x-ray device called an x-ray spectrometer. (The firm later installed one.) It can make comparatively fast analyses of raw materials. Early detection of sulfur by that method could have led to adjustments in the process and saved the heats.

X-ray has also moved to mine sources where it controls primary refining. The object: More uniformity to insure closer chemistry at the steel mill.

The Foundry Dept. at General Electric Co., Schenectady, N. Y., wanted to maintain process control. But a rapidly increasing analysis load plagued overloaded laboratories. Low alloy casting production was on the increase; aircraft and turbine people needed more high alloy castings. An x-ray spectrometer slashed analysis time 80 per cent. The elements in low alloys formerly required about 160 man-minutes to analyze—the new device takes only 30.

A similar machine sharply cut analysis time at the Curtiss-Wright Corp. plant in Wood-Ridge, N. J. Wet analysis of iron and chromium used to take 3½ hours; now it's finished in 30 minutes.



GE's transistorized thickness gage (lower right) withstands hot, dusty strip mill environments. Accuracy is within 1 per cent of thickness being measured

• A new transistorized thickness gage is exceptionally accurate, say GE engineers. Besides being rugged, it can measure 0.6 in. material to within 0.006 in. (1 per cent of the thickness).

The device (called a Raymike 600) uses two x-ray beams that come from a single tube. One, a reference beam, passes through a machined wedge positioned to match the exact thickness of the strip desired. The other, called the measuring beam, passes directly through the strip.

The beams are compared electronically and deviations are amplified and presented on an indicator mounted on a control panel. The same signal can drive other indicators, recorders, other instruments, or can be tied into an automatic gage control system.

Units next to the strip mill are housed in cast iron and steel. Components plug in for easy maintenance.

• Rolf Edholm, manager of product planning, General Electric Co., Milwaukee, says, "The cost of x-ray is microscopic compared with the enormous loss of scrapped materials in the steel industry."

Here is where x-ray can be used:

1. The control and measurement

of raw materials.

2. Measurement of pig iron and slag from blast furnaces.

3. Element control in an open hearth.

4. Thickness control of hot and cold rolled sheets in a rolling mill.

5. Alloy control before pouring (in foundries). X-ray can determine distribution of critical elements and sort castings according to element specifications.

6. Determining heat treated or annealed condition of metals.

7. Locating preferred grain orientation in rolled sheets and wires.

8. Control of galvanizing techniques.

Mr. Edholm points out that each application contributes to more efficient material use. He also forecasts more x-ray equipment for steel plants. "It's only in its infancy. The possibilities are far-reaching for greater and more accurate control."

He rates the x-ray emission gage as a major breakthrough for steel quality control. It can be used ahead of the steelmaking process for correcting raw materials and the proportions used. Used directly in the process line, it will withstand the severe environments of a mill.

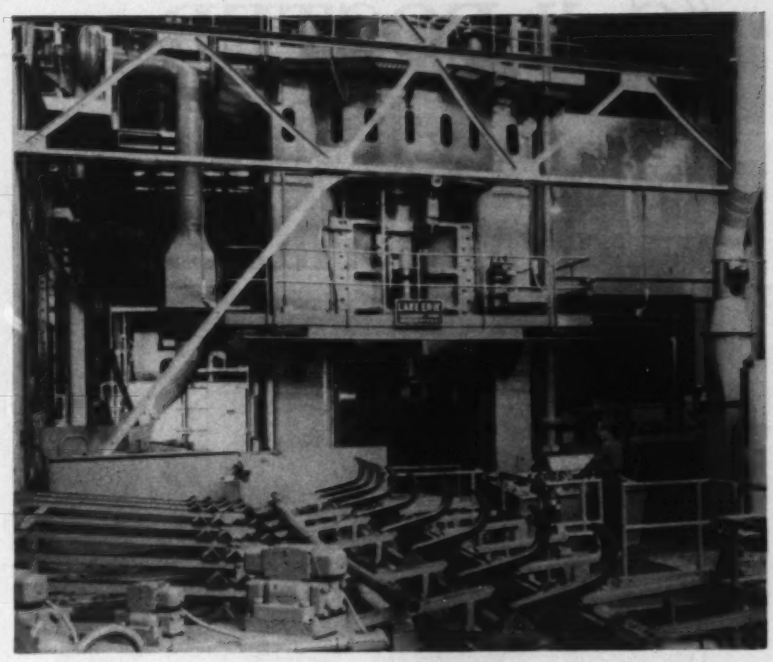
Cyanide Incineration Reduces Toxic Risks

Complete disposal of cyanide waste by fully automatic, high temperature incineration provides protection against toxic hazards, reports Joseph B. Kay, chief engineer of Prenco Mfg. Co., Royal Oak, Mich.

Solids coming from the burner stack are so fine they are invisible. The exhaust is highly diluted: Ash content registers zero when measured by air pollution standards.

The waste is fed into a hopper, ground and blended with soluble oil wastes. A pumping unit delivers the waste to an incinerator where it is burned. The minute ash particles and smoke escape into the atmosphere through a venturi type stack. From the hopper on, the system is fully automatic.

Many cyanide waste disposal systems have been based on chemical treating concepts. The treated wastes are dumped directly into a river or stream, or are flushed into a sewage line.



Extrusion Press Makes Tube Bigger, More Concentric

AN OUTSIZED vertical extrusion press is producing bigger and better seamless brass tubes for heat exchangers and condensers, claims Scovill Mfg. Co., Waterbury, Conn.

The reason: Its 2500 ton machine can handle unusually large billets and takes advantage of the superior uniformity and physical properties of continuously cast billets.

• The Lake Erie press produces shells which are then cold drawn into finished tubes in new mills at New Milford, Conn.

Shells produced in the press, says Scovill, are unusually concentric. That gives the end product a more uniform wall thickness, a factor that increases condenser life in corrosive liquids.

The press is nearly 100 ft tall and stands in a 45 ft pit which holds the shell handling equipment. Billets are heated in low frequency induction furnaces and side loaded with a dummy block into a container in the center of the press. After a light upset by the main ram, the billet is extruded over a mandrel into a basketlike container at the bottom of the pit.

A cutoff die separates shell from die, dummy block, and stump, which are ejected by another ram stroke. The shell then passes up an elevator to a quench tank and is lifted to a transfer conveyor for delivery to a trimming saw and inspection.

• The output of the new machine is almost double that of the old equipment.

Electronic controls regulate the two, 500 hp motors which power the extrusion press. It has enough precision to insure accuracy in tubes nearly twice as long as the former product.

Scovill's old equipment, for example, could handle a 7 in. billet (131 lb) and produce a shell almost 12 ft long (98.7 lb). The new machine handles a 9 in. billet (234 lb), delivering a shell more than 20 ft long (181 lb).

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Brazed Design Cuts Machining Costs

REDESIGNING a stainless steel valve housing for furnace brazing cut 40 per cent off the cost of making the part with conventional machining, says the Stainless Processing Div., Wall Colmonoy Corp., Detroit.

Internal shoulders and flanges make it expensive to machine the part for solid bar stock. The part is now made from a brazed body and cover assembly. The body is produced on a screw machine from Type 347 stainless tubing; the cover is turned from stainless steel bar stock and is press fit into the body to insure good alignment. The ring projection on the cover is serrated to provide space for the brazing alloy and insure optimum joint clearance in the finished assembly —0.002 to 0.003 in. is ideal.

The assembly is brazed with a nickel base, stainless type material (Nicrobraz) especially suited to high temperatures. After the brazing alloy and the two components are pressed together, a dry hydrogen furnace does the brazing at 2150° F. Bearing surfaces are then finish machined.

New Metal Cleanser Eliminates Acids

An electrolytic alkaline descaling and derusting process which eliminates acids in the pickling and preparation of metal for plating has been patented by Dr. Walter R. Meyer, president of Enthone Inc., New Haven, Conn.

The alkaline process avoids surface attack and the formation of carbon smut. It permits the cleaning, deoxidizing, derusting, and descaling of steel parts to be completed in one operation. In addition, the corrosion of surrounding equipment by acid fumes is eliminated.

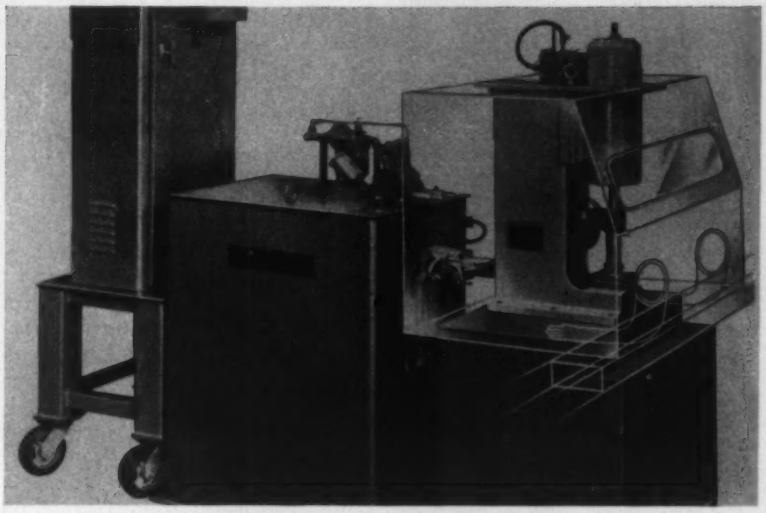
The process is marketed under the tradename Alka-Deox.

• Usership is the keynote in STEEL's $1000 contest. See the Servicenter for details.

Welding Gun Designed for Controlled Atmospheres

THE Precision, C type, magnetic force welding gun fits easily into standard dry boxes for welding under controlled atmosphere conditions. Air, water, and electrical supply lines are carried to the electrodes inside a hollow C frame. The design leaves a minimum of area for sealing to dry box walls, and gives maximum clearance around the welding area.

A rugged frame and a short throat maintain electrode alignment and surface parallelism. One welding unit that can be used develops 2200 lb weld pressure and can handle such parts as transistor assemblies having a ring projection diameter up to about 1.250 in. Other sizes are also made.



The magnetic force principle employs the same current surge that heats the weld area to exert magnetic force on the electrodes for forging the weld. The company says that results in forging at the exact moment of peak ductility, shorter weld time, and less residual heat in the parts after welding.

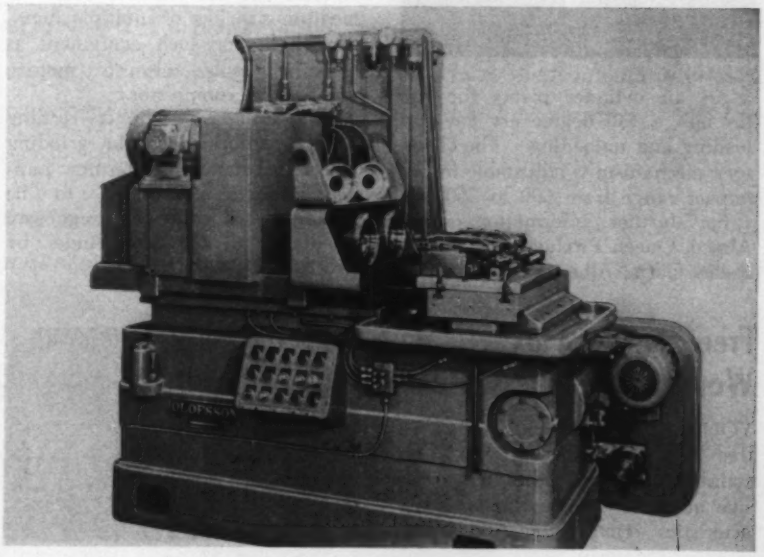
For further information, *write* Precision Welder & Flexopress Corp., 3518 Ibsen Ave., Cincinnati 9, Ohio.

Cam Contouring Unit Does Boring, Turning, Facing

WITH the Model 41 cam contouring machine, you can do production boring, turning, contouring, and facing operations (such as tapers, grooves, undercuts, and chamfers). Operations may be performed singly or in sequence.

The unit has a 4 in. cam controlled stroke on the main and cross slides. Cams are mounted on the same shaft. The table and cross slides are in direct contact with their cams, and all machine functions are electrically interlocked. Air power supply is 80 to 120 psi.

The lubrication system supply tank is in the base. It operates automatically during each cycle. Cams and cam followers are submerged in oil. Gross weight is 8000 lb.



For further information, *write*

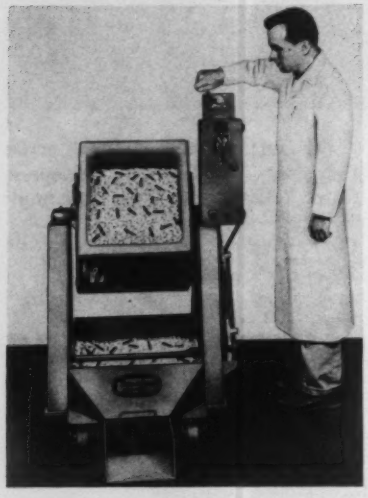
Machinery Div., Olofsson Corp., 2731 Lyons Ave., Lansing 9, Mich.

Vibratory Metal Finisher Deburrs, Descales, Cleans

THIS vibratory finishing machine (Model VT-72) can do such metal finishing operations as deburring, descaling, cleaning, burnishing, and surface refinement at reduced time cycles.

The unit has a 2½ cu ft capacity and a standard vibrating frequency of 3380 cycles per minute.

The company says the machine activates all parts and media in the tub. In many cases, parts with internal burrs can be completely deburred. Floor space requirements are 5½ sq ft.



An air cylinder pivots the tub through a 130 degree arc for easy loading and unloading. The vibratory mechanism is adjustable for an impact range from 600 to 2500 lb.

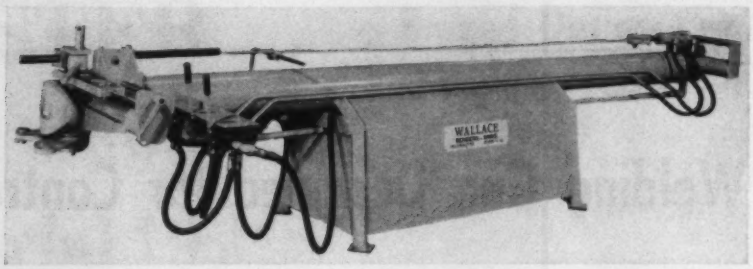
For further information, *write* Almco, Queen Products Div., King-Seeley Corp., Albert Lea, Minn.

Free Flowing Flux Works on Stainless Steel

YOU CAN use Amco No. 121 (a free flowing, soldering flux) on stainless steel and other noncorrosive alloys. Its active fluxing characteristics remove the oxides and prohibit reoxidation of both the base metal and the solder.

The company says the excellent wetting effect allows any tin-lead solder to flow freely at a minimum temperature. The metal will not buckle or discolor. The flux is packaged in 1 gallon polyethylene containers.

For further information, *write* American Solder & Flux Co., 19th & Willard Streets, Philadelphia 40, Pa.



FOUR SIZES OF THIS BENDING MACHINE are available to handle pipe, tubes, angles, channels, and other structural shapes in any bendable metal. It can also handle rolled or extruded special shapes. The four sizes handle work from 0.6 section modulus (about 2 in. standard pipe) to 18.0 section modulus (about 8 in. standard pipe). Mandrel units are available. Clamping and power pressure die movement can be ordered. For further information, **write** Wallace Supplies Mfg. Co., 1304 Diversey Parkway, Chicago 14, Ill.

Direct Reading Counter Cuts Shaft Grinding Costs

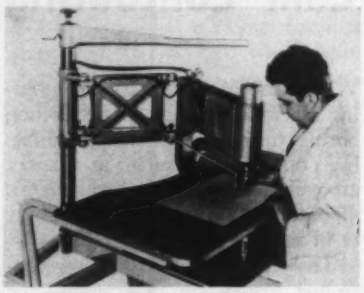
THE Size Finder made by Landis can cut setup and operating time when you're precision grinding shafts with two or more different diameters. It can handle small to medium size lots of multiple diameter shafts for such equipment as machine tools, electric motors, pumps, and compressors.

The unit is a direct reading counter calibrated to the grinding wheel feed handwheel on new Landis grinders. Diameter to be ground (within machine range) can be dialed on the Size Finder by turning the handwheel. This eliminates counting handwheel graduations.

For further information, *write* Landis Tool Co., 20 E. Sixth St., Waynesboro, Pa.

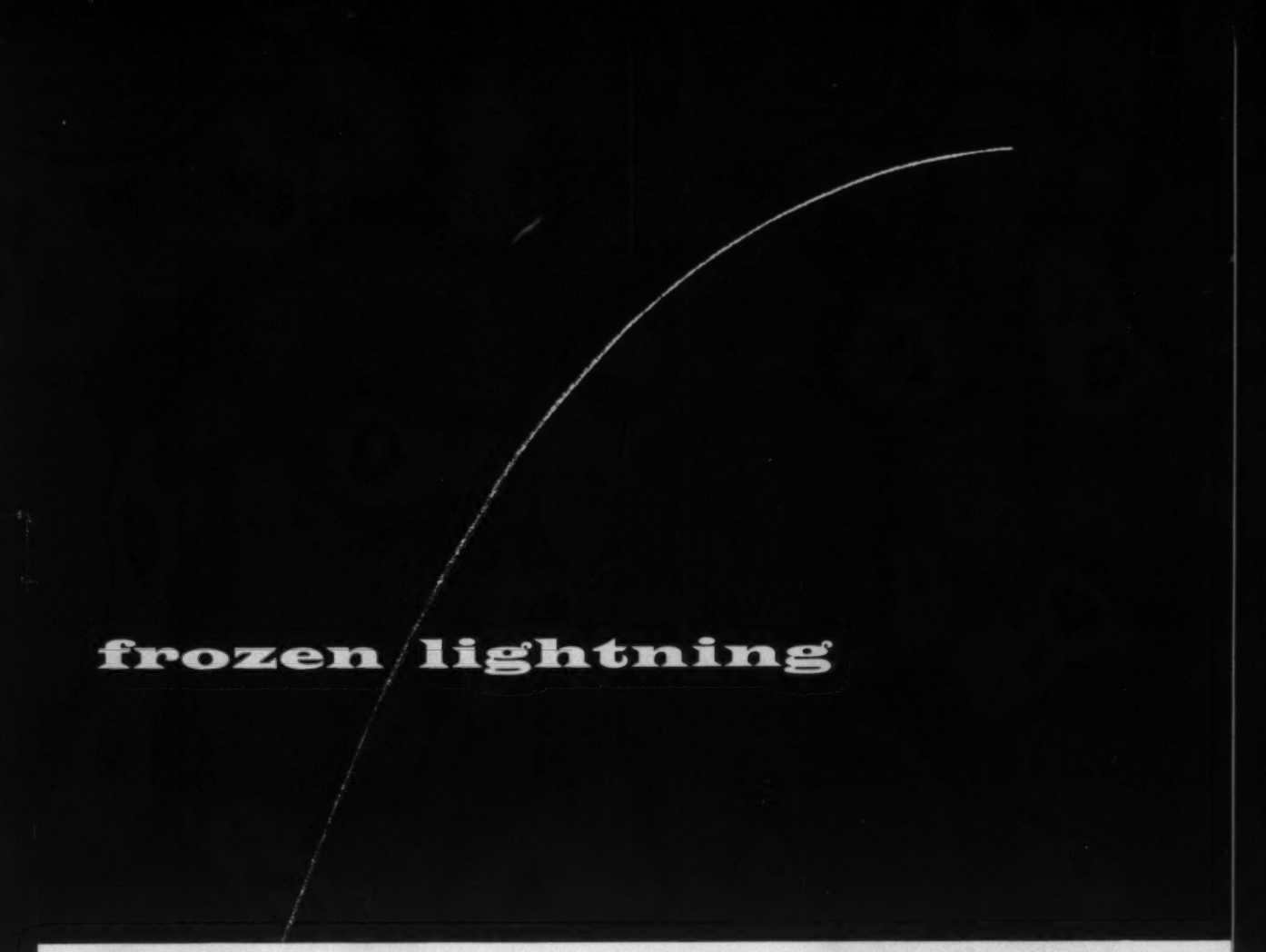
Torch Cutting Unit Works From Drawings, Templates

YOU can save time cutting sections from iron plate 0.118 to 4 in. thick with the Milo torch cutting duplicating machine. It can cut from existing drawings, templates, or automatic attachments. A pantograph, joint arm design is used.



A switchboard in the U-arm has a table with information about nozzle size, cutting speed, and oxygen pressure. Cutting gas and oxygen are conveyed separately to the torch head and mixed. Normal operation is with acetylene, but gases such as hydrogen, propane, and illuminating gas can be used.

Length of cut with a template is 75 in. (40 in. with a guide plate). Width of cut with a template is 29



That's what the Germans call the stratosphere trails of high altitude rockets. Soon, Mach 4-5 aircraft will be cutting frozen lightning trails across our own skies. Structural parts of hypersonic aircraft and missiles must function perfectly at temperatures too high for ordinary alloys.

The answer lies in predictable performance Carpenter alloys made by the exclusive Mel-Trol®, VacuMeltrol®, and Consumet® melting processes. Engine builders find them ideal for many critical parts. Forge shops report improved forgeability resulting in better finishes requiring far less machining . . . fewer rejects.

For the whole story about Carpenter predictable performance high temperature alloys, call your local Carpenter Representative or write: The Carpenter Steel Company, 139 W. Bern Street, Reading, Pa.

a new company 70 years old

Carpenter steel

The Carpenter Steel Company, Main Office and Mills, Reading, Pa.
Alloy Tube Division, Union, N.J.
Webb Wire Division, New Brunswick, N.J.
Carpenter Steel of New England, Inc., Bridgeport, Conn.

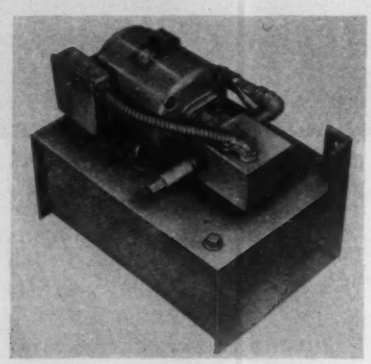
in. and 10½ in. with a guide plate. With a template, circular cuts range from ⅞ to 28½ in. The circular cut with a compass ranges from 3½ to 27½ in.

For further information, *write* Milo Mfg. Co., 259 N. Broad St., Elizabeth, N. J.

Hydraulic Power Package Adaptable for Press Duty

A HYDRAULIC power package called Auto-Power provides 1½ gpm output at 2000 psi. It's adaptable for press duty, machine feeds, lift tables, or for any intermittent or jog duty applications.

The gear pump is directly coupled to an electric motor capable of producing up to 3 hp output at its duty rating. Also built in are adjustable relief valves, ball check valves, and removable screen suction filters mounted on a 4½ gallon oil reservoir.



Optional accessories include a solenoid controlled, one way return valve with a built-in, pressure compensated, flow control.

For further information, *write* Autoquip Corp., 1140 S. Washtenaw, Chicago 12, Ill.

Motorized Fixture Permits OD, ID, Form Grinding

A COMPACT, motorized fixture (called Mini - Grind) enables throughfeed or form grinding operations to be efficiently performed on cylindrical parts with conventional surface grinders. The device has

an outside diameter driving and adjustable roller clamping arrangement to provide absolute concentricity. Not used: Centers, chucking devices, or indicators.

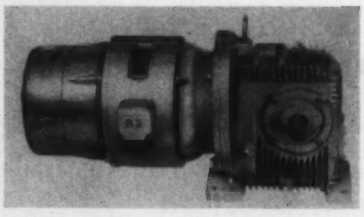
The fixture can be quickly changed over from one production part to another. It can be quickly adapted with interchangeable details to throughfeed OD grinding on surface grinders. You can also use it on internal grinders to perform internal grinding where absolute concentricity with the outside part diameter is required.

For further information, *write* Products Supply Co., 1178 Woodward Heights Blvd., Ferndale 20, Mich.

Motor Reducer Rated From ½ to 15 hp

LOAD CARRYING contact area between the worm and gear teeth has been increased almost 100 per cent in the Reuland Motoreducer. The greater contact area reduces unit pressure and enables lighter rated units to carry loads ordinarily requiring much larger and heavier housings.

The units are available in ratings from ½ through 15 hp. Speed reduction ratings (from rated motor speeds) are 525 through 7.3 rpm.

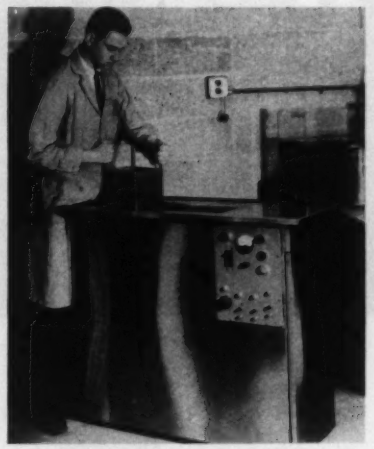


You have a choice of drive motors. Reuland Fluid Shaft, Slip Ring, torque, multispeed, and magnetic brakes can be easily combined into power packages.

For further information, *write* Reuland Electric Co., Westminster at Mission Road. Alhambra, Calif.

Ultrasonic Degreaser Removes Chips, Soil

THE Model AC-25 Sonogen is a self-contained ultrasonic degreaser in a stainless steel cabinet. The unit can remove metal chips, grease, and certain insoluble soils (even from intricate parts). Parts such as small motors, electronic subassemblies, and bearings can be ultrasonically cleaned without dismantling.



After immersion in the tank, work is spray rinsed by hand, placed in the vapor zone, and then removed. The unit measures 44 x 36 x 18 in. Separate generators, cleaning chambers, or rinsing tanks are not used.

For further information, *write* Branson Ultrasonic Corp., 40 Brown House Rd., Stamford, Conn.

Horizontal Bandsaw Has 24 x 36 in. Capacity

YOU CAN cut a 21 in. round aluminum billet in 10 minutes with the BP-1 horizontal bandsaw. The machine is 107 in. high, 101 in. side to side, and 60 in. front to back. It has a variable speed drive from 45 to 1200 fpm with a 5 hp drive motor. Blade size is 22 ft 1 in. x

CENTURY MOTORS PULL HEAT OUT OF 42-STORY BUILDING

Forty-two stories above Dallas, on top of the South's tallest building, three Century 50 horsepower motors are driving induced draft fans to keep the Southland Center cool.

Heat absorbed by air conditioning and refrigeration systems must be returned to the atmosphere as efficiently as possible. Increasing industrial, commercial and domestic water consumption makes it necessary to use systems which recirculate and conserve the cooling water. This cooling tower is part of such a system.

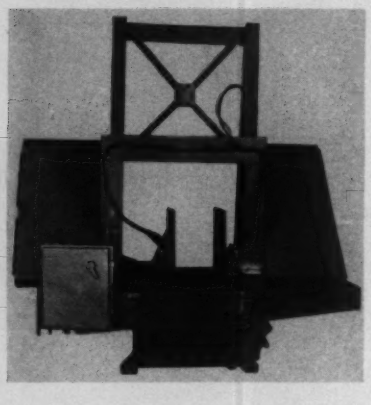
Continuous driving of three huge multi-blade fans is necessary to the operation of this three-cell tower. The Century motors are subject to all sorts of weather—heat, moisture, rain, wind, corrosion. But they keep working—continuously. Century application engineers understand such requirements—call your Century District Office or Authorized Distributor.

CENTURY ELECTRIC COMPANY

St. Louis 3, Missouri *Offices and Stock Points in Principal Cities*

Century

59-23



1¼ in. x 0.042 in. Cutting capacity is 24 in. wide x 36 in. high.

The saw has three intake and three outlet rollers and is hydraulically operated and fed. Blade wheel doors are interlocked with the electrical system. Opening the doors automatically shuts off the machine.

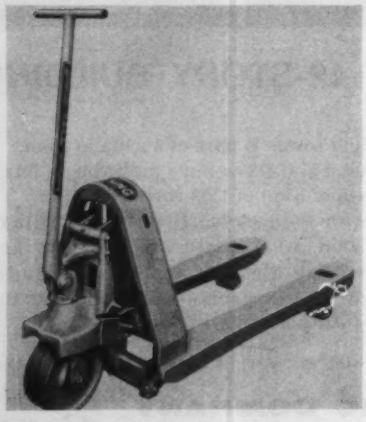
For further information, *write* W. F. Wells & Sons Inc., Three Rivers, Mich.

Hand Lift Truck Has Fork Widths to 30 in.

A 3000 LB CAPACITY hydraulic hand lift truck is suitable for use with double or single faced pallets. It has 4 in. of lift with seven strokes of the operating handle. Lowering the load is controlled by a release pedal. Three hardened steel rollers in the fork tips facilitate entry into double faced pallets.

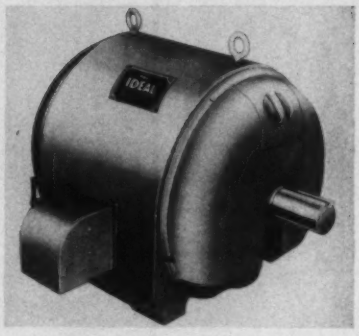
Standard fork frame lengths are 32, 36, 42, 48, 54, and 60 in. Standard fork widths are 19, 25, 27, and 30 in. Rubber front wheels and aluminum rear wheels are standard. Steel, Flor-Savr, and Polyurethane surfaces are also available.

For further information, *write* Yale & Towne Mfg. Co., 11000 Roosevelt Blvd., Philadelphia 15, Pa.



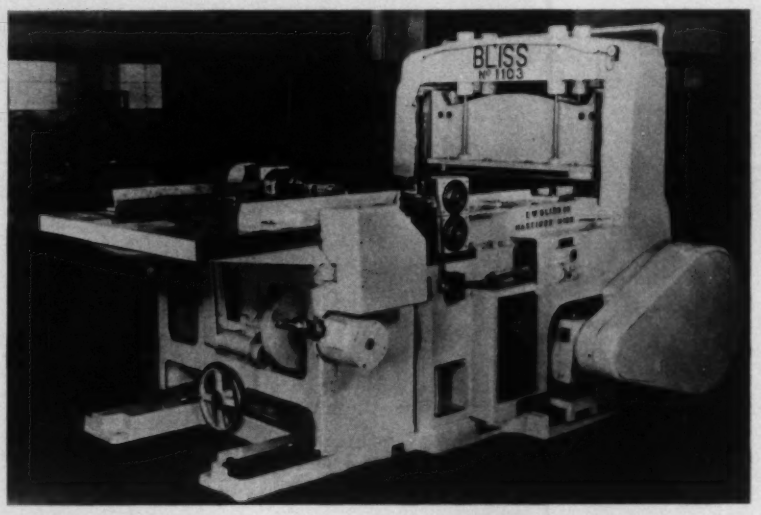
Induction Motors Rated From 100 to 5000 hp

HIGH speed induction motors rated from 100 to 5000 hp (514 to 3600 rpm) are available in frames 584 to 11320. A one piece, wrap around, steel plate cover runs the length of the frame and extends well below the center line of the motor on each side. A double end ventilation system is used.



Motors are available with silicone rubber or Class A, B, and H insulations.

For further information, *write* Ideal Electric & Mfg. Co., Mansfield 32, Ohio.



Scroll Shear Has Many Improvements

HIGHER RATES of output and new maintenance advantages are claimed for the Bliss No. 1103 scroll shear. It can be used in production of scrolled strips used in the manufacture of can ends, screw caps, and similar closures.

Improvements include elimination of the idle stroke between sheets—every stroke is a cutting stroke. It's capable of shearing sheets up to 36 in. square. Trimming cutters can be ground in place by a standard slitter cutter grinder. Access to the cutters is provided by mounting the first table on gibbed ways so it can be slid back from the second table.

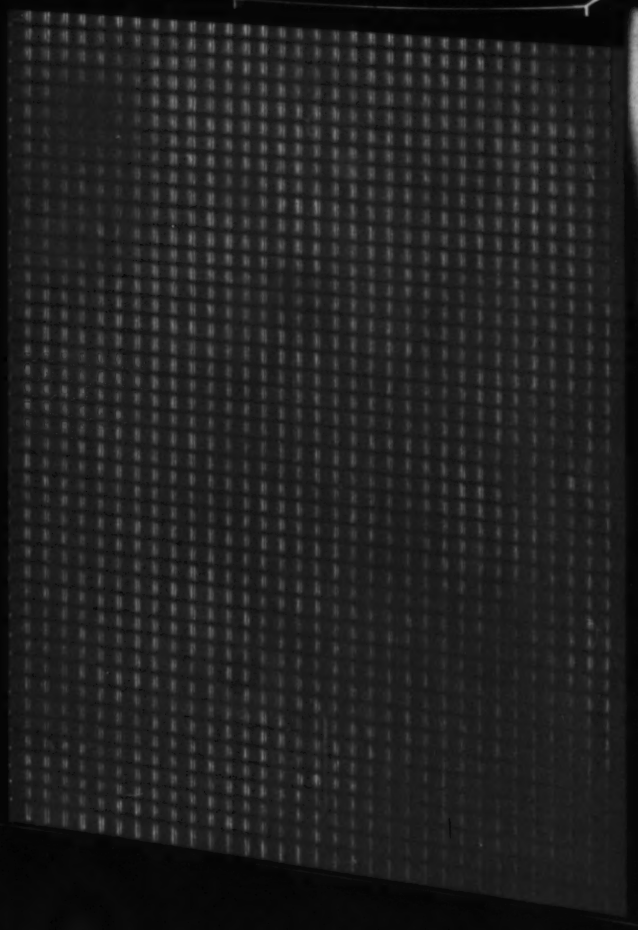
Cam actuated side gages on the first table adapt the scroll shear to either lithographed or plain sheets. Sheet registry is obtained by magnetic feed bars and hardened back gages.

Strips can be automatically discharged to the top stacking bin, and scrap from the first cut can be collected in a second bin. A third

Just a touch tells you—

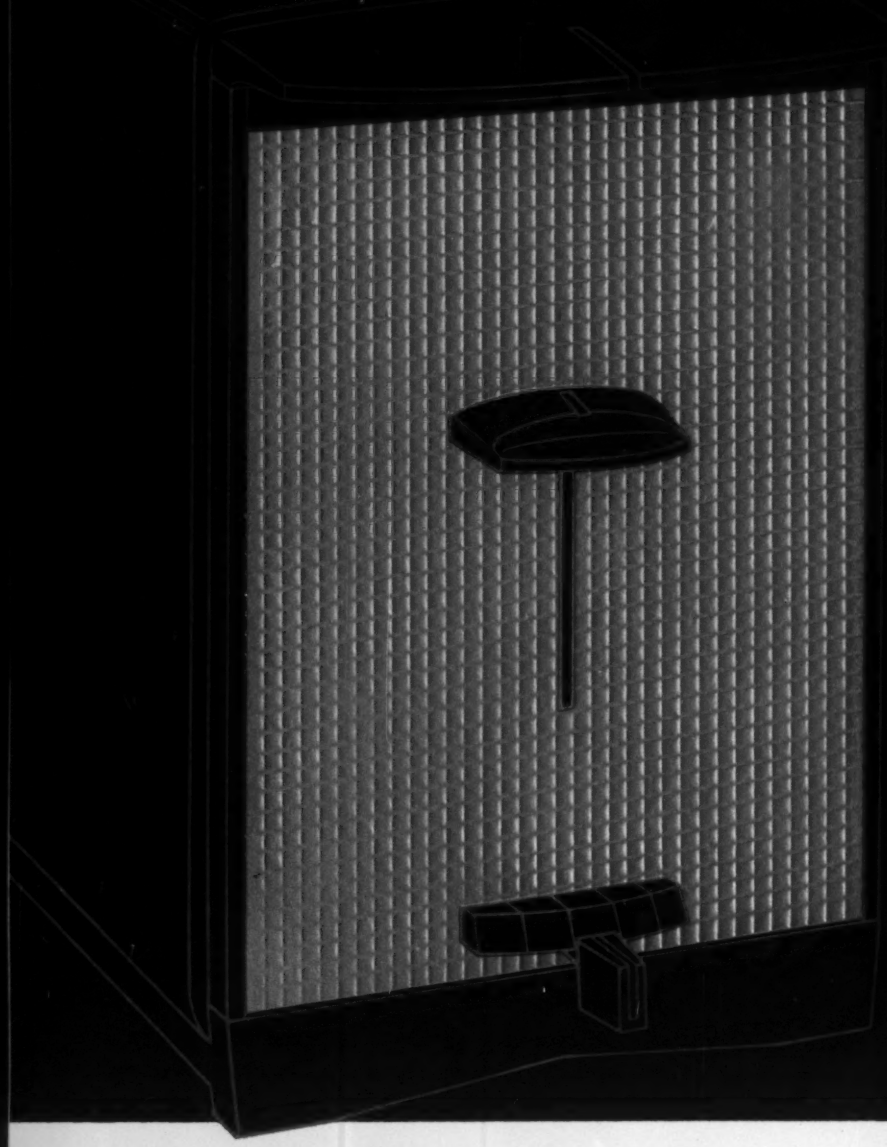
how this
Mary Proctor
Toaster
took on new

sales appeal



Gold-finished panels of USS American Embossed Amerstrip add richness, smart modernity to classic toaster lines

New Proctor Electric Company toaster styled by Raymond Loewy Associates has special design USS Embossed Amerstrip



This Mary Proctor toaster is beautiful—and different. On the sales counter it stands out from its competitors. Much of this sales-pulling distinction lies in the end panels formed from gold-finished, geometric-patterned Embossed Amerstrip. This effective pattern was created by famous industrial designers, Raymond Loewy Associates, and was rolled by American Steel & Wire.

The USS Embossed Amerstrip was given a No. 4 temper which is especially suitable for formation work. It was rolled to .0239-inch thickness and trimmed to 5⅞-inch width with a No. 3 slit edge. So that the strip would make a good bond with the gold plate it was supplied with a No. 3 finish—the best finish available on strip. It is guaranteed against surface defects and has a sufficiently high lustre to make buffing or polishing before plating unnecessary. To protect the finish and the embossed design, the coils were interleaved with rolls of paper before shipping.

American Steel & Wire specializes in the rolling of special embossed designs for specific applications. If you have a product which could be made more beautiful or more sales-appealing with Embossed Amerstrip, get in touch with American Steel & Wire. Write to 614 Superior Avenue, N.W., Cleveland 13, Ohio. *USS and Amerstrip are registered trademarks*

American Steel & Wire Division of United States Steel

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
Tennessee Coal and Iron Division, Fairfield, Ala., Southern Distributors
United States Steel Export Company, Distributors Abroad

bin can be used to collect the last strip (with one straight edge) to separate it from the full scrolled strips.

For further information, *write* E. W. Bliss Co., 1375 Raff Rd. S. W., Canton 10, Ohio.

Centerless Grinder Infeed Can Do Duplicate Sizing

AN AUTOMATIC "Lo-Die," centerless grinder, infeed attachment can do precision grinding and duplicate sizing with a wide, variable feed rate from 12 to 40 pieces a minute (depending on tolerance and finish desired). A controlled grinding and dwell cycle removes stock and holds finish constant.

The unit is driven by a ¼ hp, 220 volt, 3 phase motor. Parts are air ejected after grinding. Weight has been reduced by aluminum castings. Cams are hardened, ground steel. Oilite bronze and tapered bearings are used.

For further information, *write* Lordstown Tool & Die Co. Inc., R. D. 2, Warren, Ohio.

Radiographic Equipment Tests Castings, Weldments

EQUIPMENT using radioisotopes such as cobalt 60, iridium 192, cesium 137, and thulium 170 is available for nondestructive inspection of metal castings, parts, and weldments.

Fourteen basic machines are offered with a variety of mounts. The machines may be obtained with more than one source position to permit the use of two or more sources with different radiographic properties with the same unit.

Most of the equipment can be used for panoramic exposures where a source exposed in the center of a specimen group radiographs them simultaneously.

Some units can be used for beam exposures.

For further information, *write* Radiation Engineered Services, Lafayette & Water Streets, Norristown, Pa.

Cleaning Materials Match Basic Industrial Jobs

FOUR cleaning compounds for production cleaning of metal parts have been matched to basic industrial processes.

A hot power washer called Cerfa-Kleen HPW is a heavy duty compound with no free caustic. It's nonfoaming, noncaking, and contains a rust preventive.

Type CPW, a cold power washer, is a formulation of mild, fast dissolving alkalies usable at room temperature. The material is nonfoaming, noncaking, nondusting, and has no free caustic. A rust preventive and a water softener are added.

Cerfa-Kleen HST for hot soak tanks can do fast immersion cleaning in hard water. The high detergency compound is nondusting, noncaking, and has no free caustic.

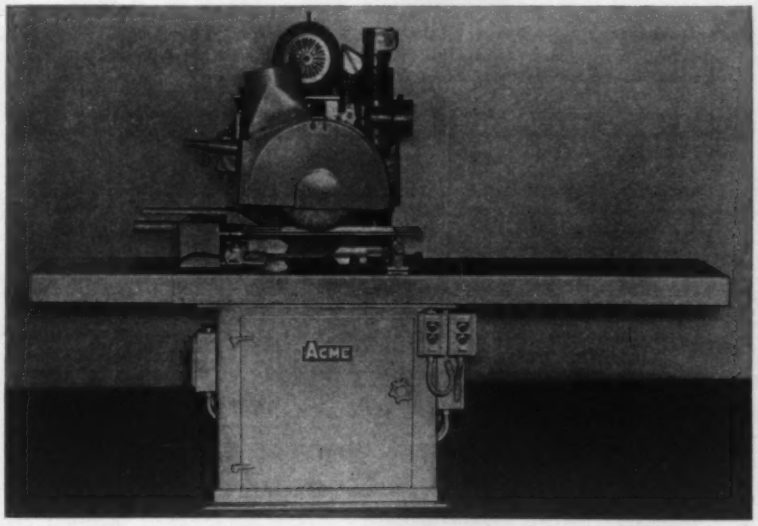
Type CST for cold soak tanks can be used to replace toxic or flammable solvents. The concentrated liquid has no free caustic. It can also be used for wipeoff, tumbling, and other mechanical cleaning.

For further information, *write* E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.

Calibrating Unit Aids in Bolt, Stud Tensile Tests

A PRECISION calibrating unit tests tensile of bolts and studs (up to 2½ in. in diameter) with loads up to 225,000 lb. The unit (Model K) is portable, direct reading, self-contained, and certified accurate within 2 per cent.

For further information, *write* Skidmore-Wilhelm Mfg. Co., 442 Green Rd., Cleveland 21, Ohio.



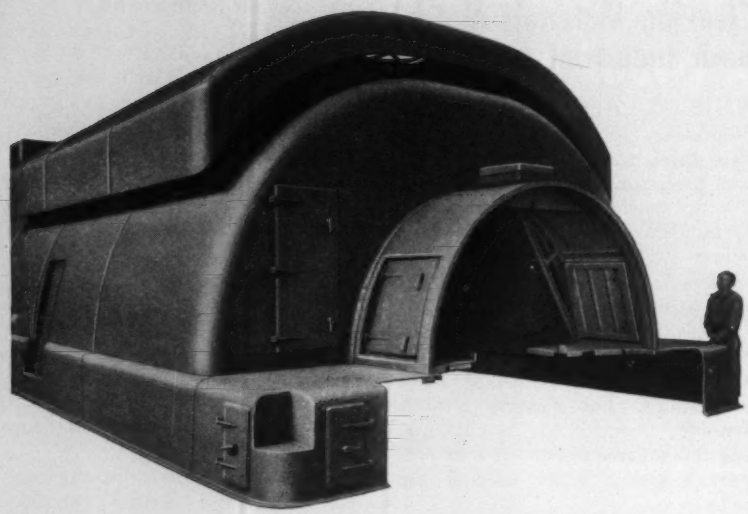
Machine Polishes, Buffs Tube Shapes

AN AUTOMATIC polishing and buffing machine finishes round, square, hexagonal, or octagonal tubular metal parts. It can also be used for automatic deburring of tubular parts or parts having holes that enable chucking on a mandrel.

Buffing wheels, abrasive belts, setup wheels, or wire brushes can be used on the machine. The unit has a motorized head, reciprocating worktable, and a cam operated index mechanism for a group of mandrel assemblies mounted on the table.

Standard models have 48 in. maximum table travel. Parts up to 42 in. long can be handled. The machine occupies a floor space (including table clearance allowance) of about 4 x 9 ft. It's about 6 ft high.

For further information, *write* Acme Mfg. Co., 1400 E. Nine Mile Rd., Detroit 20, Mich.



FOR CUSTOM FABRICATION

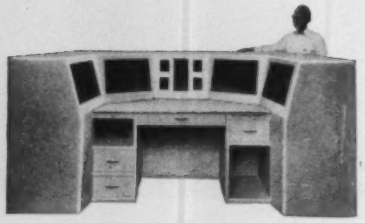
SPECIFY *Kirk and Blum*

What is the most economical way to fabricate your components? Ask Kirk & Blum . . . a firm that, for more than 50 years, has maintained the confidence of the nation's outstanding manufacturers with substantial savings in time and cost.

Kirk & Blum's experienced craftsmen are adept at a multiplicity of production techniques for maintaining quality and uniformity at lowest cost. Often, they develop special tooling that opens new vistas of economy.

The extensive facilities and equipment of Kirk & Blum's 170,000 sq. ft. plant offer a capacity for sheet steel fabrication to ½" thickness. Working with aluminum, copper, monel, stainless and other alloys is a K&B specialty.

Request your copy of the new 40-page Kirk & Blum Sheet and Plate Fabrication Catalog. Better yet, send us your prints for prompt quotation.



THE KIRK & BLUM MANUFACTURING CO.

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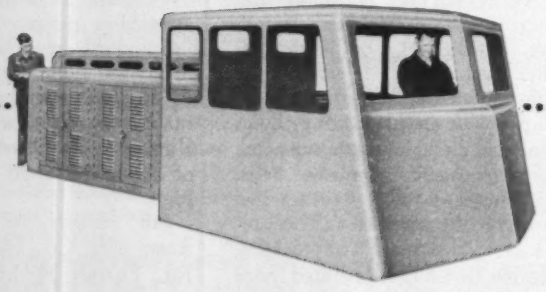

NEW literature

Write directly to the company for a copy

Abrasive Blast Cleaning

Information to help users of blast cleaning equipment get higher production and finer finishes at lower costs is contained in a handbook. Wheelabrator Corp., 659 S. Byrkit St., Mishawaka, Ind.

Ultra-V Drives

Bulletin No. 9102, 36 pages, gives information on a drive said to reduce over-all dimensions by as much as 50 per cent, save up to 25 per cent in weight, and save up to 30 per cent in cost over conventional V-belt drives. T. B. Wood's Sons Co., Chambersburg, Pa.

Cold Heading Copper

A 4 page reprint discusses the economy and methods of cold heading copper. Dept. TR, John Hassall Inc., Cantiague Road, Westbury, N. Y.

Cost Saving Metal Components

"How Moving Metal Reduces Parts Cost," Bulletin 900-P5, describes stamping, upset forging, rotoforming, and other finishing processes. Commercial Shearing & Stamping Co., 1775 Logan Ave., Youngstown 1, Ohio.

Cr-Mo-V Steel

A folder discusses current thought on the resistance of chromium-molybdenum-vanadium steels to graphitization while exposed to extended operation at elevated temperatures, as well as creep strength and stress-rupture strength values. Vanadium Corp. of America, 420 Lexington Ave., New York 17, N. Y.

Gas Welding and Cutting

A 36 page catalog describes a line of gas welding and cutting hand torches, outfits, tips, and accessories. Air Reduction Sales Co., a division of Air Reduction Co. Inc., 150 E. 42nd St., New York 17, N. Y.

Quality Control System

A 4 page leaflet is offered as an aid in setting up a quality control and technical development laboratory. Small Business Administration, Washington 25, D. C.

Polypenco Industrial Plastics

A 16 page booklet outlines properties, applications, and availabilities of Polypenco nylon, Teflon, Fluorosint TFE base resin, and other new industrial plastics. Polymer Corp., 2120 Fairmont Ave., Reading, Pa.

Abrasive Finishing Methods

A data sheet contains recommendations for producing selected finishes on carbon and stainless steels. Lea Mfg. Co., 16 Cherry Ave., Waterbury 20, Conn.

ONLY VISIBLE BLADES GIVE YOU SAFETY YOU CAN SEE!

• The men who pull the switches will tell you what can happen when a switch, *believed* to be open —*isn't*. A lot of things can happen—and every one of them is bad. Personnel safety is in jeopardy. Motors can single-phase. Machinery and work can be damaged. Down-time can skyrocket.

Doesn't it make sense to insist on **V**isible **B**lade construction which gives you a road block against any of those possibilities? Doesn't it make equally good sense to insist on the safety switch which gives you that construction—plus a lot of other performance advantages? Evidently it does, because *Square D switches have never been out of first place in more than 50 years!*

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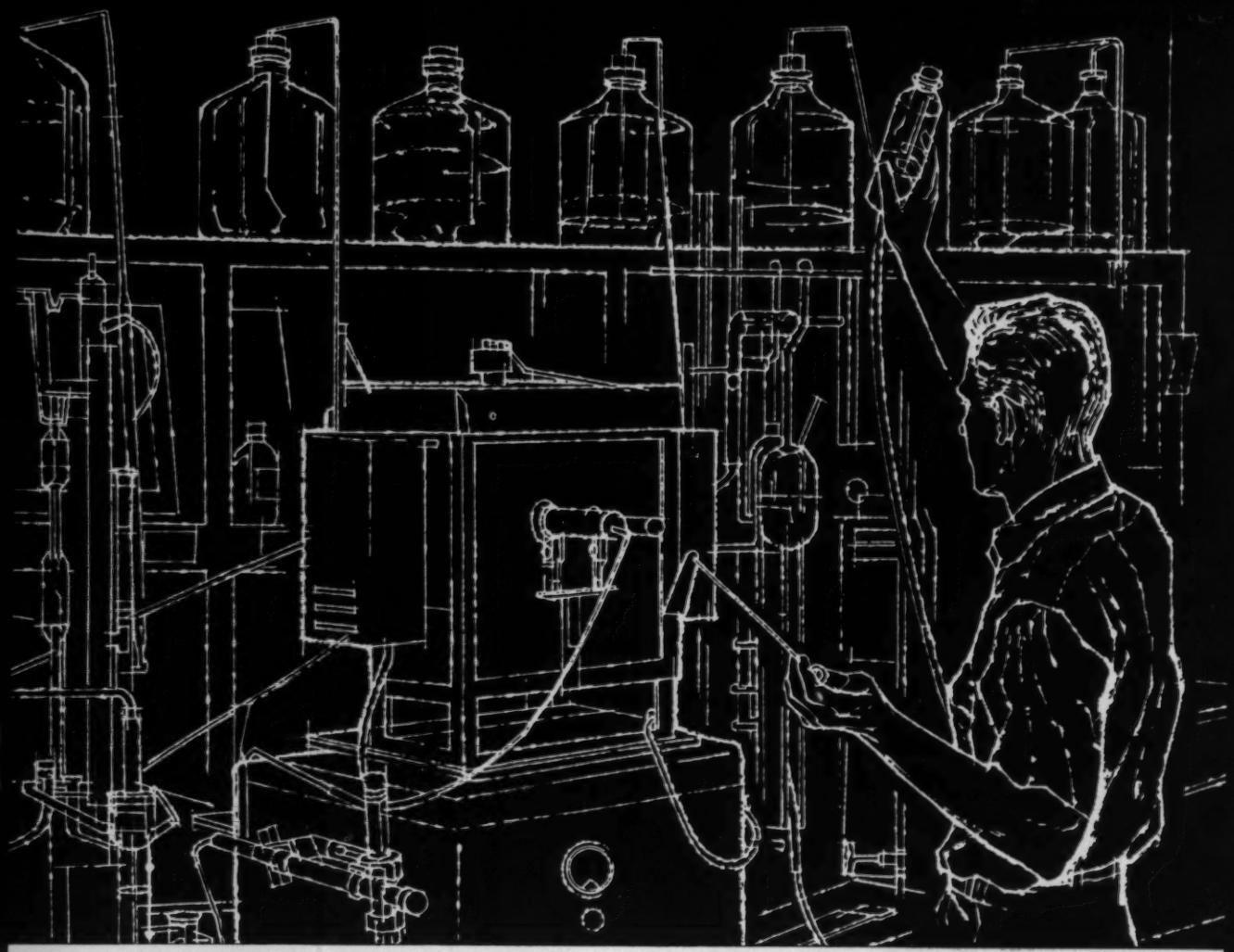


PRECISE ANALYSIS CONTROL

to your restricted specifications with

J&L Cold Rolled Strip Steels

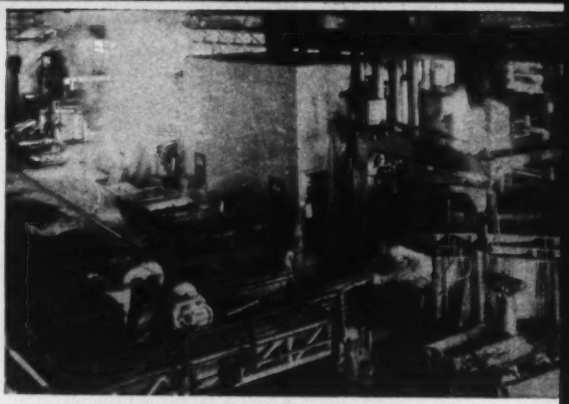
Controlled analysis is one of the basic factors necessary for quality strip steels.

J&L offers you an experienced organization devoted to strip steel processing combined with fully integrated melting facilities designed for **controlled** analyses.

J&L's leadership in the use of basic oxygen furnaces, high standard open hearth practice and electric furnaces permits melting to more accurate analysis ranges than usually considered necessary. Above all, they assure cleanliness with residuals and inclusions held to a minimum.

With an organization experienced in specialized strip steel processing, your standard or most rigid specifications can be met consistently.

For your convenience, precision strip facilities are available to you in our plants at Youngstown, Indianapolis, Los Angeles and Kenilworth (N. J.)



J&L offers all three—basic oxygen converters, high standard open hearth practice and electric furnace melting to meet your **restricted specifications.**

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LOW CARBON • HIGH CARBON • ALLOY • STAINLESS
TEMPERED SPRING STEEL • ZINC AND COPPER COATED

Jones & Laughlin Steel Corporation • STAINLESS and STRIP DIVISION • Youngstown 1, Ohio

Steelmakers Pin Hopes On Autos

NEW CAR SALES haven't been up to expectations thus far, but automakers aren't exchanging their glad rags for sackcloth and ashes. It's a little too early for that.

In Detroit, hopes are still high. Industry spokesmen aren't budging from earlier predictions that consumers will buy 6.5 million, U. S. built, new cars this year. Production planners aren't considering sharp cutbacks in February schedules. Buyers aren't canceling orders or asking that shipments be delayed.

STEELMAKERS ANXIOUS—Since the carbuilders and their suppliers traditionally take about 20 per cent of the steel industry's output, concern about new car sales is probably as great in Pittsburgh, Chicago, and Youngstown as it is in motordom's capital. Steelmakers are counting on the automotive market to keep their mills humming after the artificial stimulus of inventory building subsides.

SALES ON UPSWING—Last month's car sales (about 387,000) were 7 per cent better than December's, reversing a downtrend. But even though sales took an encouraging turn, they lagged far behind assemblies (689,000). Result: Dealer inventories increased to about 800,000. (The all-time high, including imports, is close to 1.1 million units.) It's clear that automakers will have to cut their production schedules unless sales get into high gear.

NO BIG CUTBACKS—Carbuilders plan only modest adjustments this month. Reason: They're aware that premature cutbacks could be followed by a spring buying surge that would force them into double shifting. Ford may reduce its February output by 8 per cent, Chrysler by 5 per cent. General Motors is reportedly standing firm. So is American Motors, which says it might even increase its output. *Ward's Automotive Reports* predicts that the industry will lower its February target by 3.5 per cent—from 754,800 to 728,400.

AND NO CANCELLATIONS— Even though they may soon put the brakes on their steel consumption, automakers aren't canceling tonnage or asking suppliers to stretch out deliveries. Inventories are in good shape.

FASTER DELIVERIES— The automotive picture notwithstanding, chances are still good that U. S. mills will ship a record-breaking 51 million tons of finished steel in the first half. In the past week, there has been a continued easing in delivery promises for shapes, plates, bars, wire products, and commercial pipe. Even hot rolled sheets have loosened appreciably.

MORE PLATES, ANYONE?— Although first quarter allocations for plates looked pretty skimpy at the outset, few consumers have been seriously inconvenienced. Quotas were deliberately set low in anticipation of slow startups, wildcat strikes, and mechanical breakdowns—problems that were negligible during the injunction period. With better production than they expected—and less demand from shipbuilding and railroads—platemakers are calling their customers and offering them additional tonnage for March.

OUTPUT OFF SLIGHTLY—Last week, steelmaking operations were at 94.5 per cent of capacity, 0.9 point below the previous week's revised rate. Production was about 2,693,000 ingot tons.

WHERE TO FIND MARKETS & PRICES

	News	Prices
Bars, Merchant	111	116
Reinforcing	111	117
Boiler Tubes	...	121
Canada	...	124
Clad Steel	...	122
Coke	...	124
Coal Chemicals	...	124
Charts:		
Finished Steel	...	115
Ingot Rate	114	...
Scrap Prices	...	127
Comparisons	...	115
Contracts Placed	134	...
Contracts Pend.	134	...
Electrodes	...	*
Fasteners	...	121
Ferroalloys	113	125
Fluorspar	...	124
Footnotes	121	...
Imported Steel	...	124
Ingot Rates	114	...
Metal Powder	...	124
Nonferrous Met.	130	132
Ores	...	124
Pig Iron	...	123
Piling	...	116
Plates	112	116
Plating Material	...	133
Prestressed Strand	...	121
Price Indexes	...	115
Producers' Key	117	...
R.R. Materials	...	121
Refractories	...	124
Scrap	127	128
Semifinished	...	116
Service Centers	113	123
Sheets	111	117
Steel Output	114	...
Steel Shipments	114	...
Silicon Steel	...	118
Stainless Steel	112	122
Strip	111	118
Structurals	133	116
Tin Mill Prod.	...	118
Tool Steel	112	122
Tubular Goods	112	122
Wire	111	118

*Current prices were published in the Feb. 1 issue and will appear in subsequent issues.

Metalworking Outlook—Page 33 Technical Outlook—Page 77

Standard has been producing welded steel tubing

. . . *for forty years*

In chemical plants, refineries and industries around the world are countless miles of electric weld boiler and heat exchanger, pressure and mechanical tubing from The Standard Tube Company. Over the past ten years, Standard has also supplied millions of feet of oil well tubing and casing.

You who are responsible for the purchase of tubular goods are assured highest quality when you specify Standard . . . the same product reliability as found in Standard's oil country tubing.

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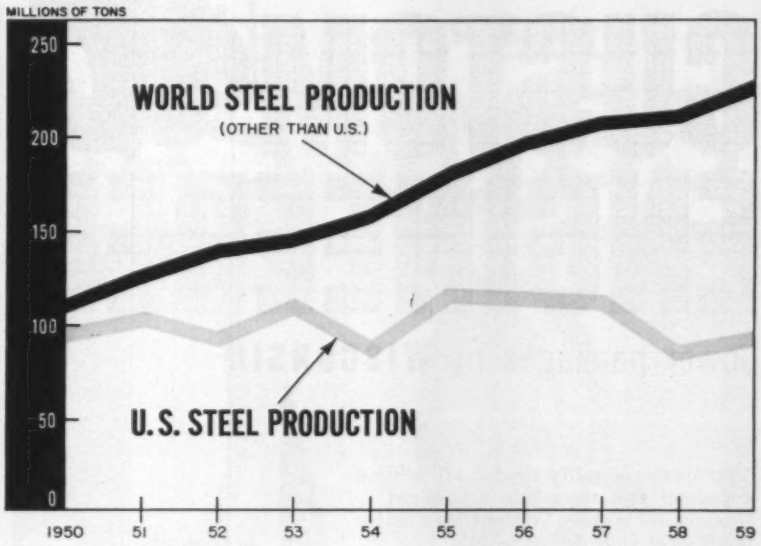
Look for Comeback in Steel Exports

STEELMAKERS are mapping strategy to regain export markets lost during the strike. The outlook is two pronged:

Exports of iron and steel products this year should climb to about 3 million tons, a million tons over the 1959 mark. But over the long term, the industry will have to overcome some terrific odds to reach the 6.9 million ton volume it had in 1957.

The drop in steel exports during 1959 was only partly due to the 116 day strike. Robert M. Buddington, vice president-sales, Inland Steel Co., points out that the change in steel's foreign position "is not an isolated phenomenon but part of a broader change in the whole U. S. position." Last year it culminated in an unfavorable steel trade balance for the first time in a half century—imports topped exports by more than 2.3 million tons (see STEEL, Jan. 11, p. 102).



Exports of Iron and Steel Products

(Net tons)

Products:	1959*	1958	1957	1956
Semifinished Steel	22,580	124,326	721,116	528,758
Shapes & Plates	268,746	554,236	1,075,112	671,559
Rails & Accessories	88,586	172,254	245,192	94,511
Bars & Tool Steel	57,781	123,098	214,100	296,900
Pipe & Tubing	247,812	623,044	1,185,697	782,966
Wire & Wire Products	22,711	35,055	38,374	55,265
Tin Mill Products	237,462	351,972	620,392	651,436
Sheets & Strip	387,925	703,430	1,076,306	1,075,352
Other Iron & Steel	441,098	606,452	831,467	654,877
Pig Iron	8,850	103,348	879,652	267,175
Ferroalloys	56,258	51,543	65,883	86,672
Totals	1,839,809	3,448,758	6,953,291	5,165,471

*Ten months.

• **The Reason** — Explanation for the reversal is found in the expansion of overseas steelmaking capacity. Since the war, foreign facilities have been installed at an unprecedented rate—with tremendous financial and technical help from this country. Direct and indirect assistance (from 1940 to 1956) totals more than $866 million.

• **About 50 countries have steelmaking capacity compared with only about 25 in the early 1930s.**

This country is still the top steelmaking nation, but its advantage is shrinking. Ten years ago, U. S. production represented about 47 per cent of the world's total. It now accounts for less than 29 per cent. Production by Free World countries (other than the U. S.) totaled 133 million net tons last year while that of Iron Curtain countries (principally Soviet Russia) amounted to about 93 million. U. S. production exceeded 93.4 million (see chart).

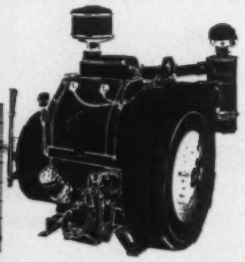
Foreign producers, with modern plants that rival the best in the U. S., have stepped up their competition in world markets. They have even invaded U. S. territory on an alarming scale. The reason: Low prices made possible by advantageous employment costs. U. S. steelworkers are paid three to seven times as much as their counterparts in Europe and Japan, and the recent wage agreement will widen the gap appreciably.

• **U. S. steelmakers will have to fight harder for their share of world steel business.**

They face a formidable task. But trade authorities think that, with government assistance, an approach to the challenge can be developed. Departure from established methods may be necessary, such as the making of capital investments abroad. Many U. S. manufacturing firms have built or purchased foreign subsidiaries, or have entered into licensing agreements with overseas interests in recent years.

Whether such policy is feasible, or desirable, for the steel industry

How you can materially improve your product dependability by specifying



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is uncertain. But the possibilities merit consideration. The European Common Market (France, West Germany, Italy, Belgium, The Netherlands, and Luxembourg) and the so-called Outer Seven or European Free Trade Association (Great Britain, Norway, Sweden, Denmark, Austria, Switzerland, and Portugal) appear to offer attractive locations for capital investment.

• Rivalry between European trading blocs recently prompted the U. S. to sponsor a new European economic organization. Canada and the U. S. would be full members.

It's feared that rivalry between the two European trade groups might result in tariff action that would adversely affect U. S. trade. Also, an economic split among West European nations might have repercussions on the defense alliance.

In recent years, the Western Hemisphere has provided the chief foreign markets for U. S. steel exports. Shipments to Canada and Latin America have accounted for 60 to 70 per cent of export tonnage. Europe has usually taken 15 to 20 per cent, Oceania and Africa about 5 per cent.

Obviously, capital investment is only a remote possibility in most trading areas as an answer to the export problem. Here are some practical recommendations for immediate application:

- Develop a general awareness of the implications of foreign trade for the national economy (steel exports account for 5 per cent of total mill shipments).
- Learn more about foreign competition—costs, products, and other information needed for a thorough understanding of the job faced.
- Urge the government to press for removal of foreign trade barriers.
- Accelerate research and development, so as to be able to hold our position with respect to quality and specialized steels.
- Lower production costs through increased efficiency, making competitive prices possible.
- Sell harder—sharpen sales methods all along the line.
- Offer better service and technical assistance.
- Promote higher living standards abroad.
- Seek government aid in finding and developing new markets.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 117 & 118

Some sheet sellers are promising deliveries against new orders by the end of April on hot rolled, and late May on cold rolled. They can do even better on some specialties. Galvanized is in tightest supply of the sheet grades, with little available for the first half, and consumers pushing for third quarter tonnage with little success.

Pittsburgh area producers say cancellations have been negligible, but they're apprehensive about automotive demand. Auto assemblies are well ahead of retail sales, dealer stocks exceeding 700,000 units.

After running 20 turns weekly in early January, a large specialty mill has cut back to 18 turns. A further cut to 15 is contemplated.

Although the sheetmakers have experienced a letdown in the rate of new orders, allocations will probably be continued for months.

Wire . . .

Wire Prices, Pages 118 & 121

Pressure for wire deliveries has lessened. Manufacturers' wire and wire rods are being booked for late March and early April shipment. Merchant items are available for March delivery. Automotive requirements are expected to hold up through the first half of the year.

Demand for building wire products, including prestressed strand, is seasonally heavier.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 117

Substantial business is being booked in reinforcing bars, but shipments are down seasonally at most distributing points. Deliveries will pick up next month as building activities begin to open up. Right now other reinforcing steel items, such as building and road mesh, are going into stockpiles.

Steel Bars . . .

Bar Prices, Page 116

Some hot barmakers are wondering how much longer high demand will keep them producing at capacity. Demand for wider and thicker flats and the heavier rounds is strong, but general pressure on the market is easier. However, few cancellations or requests

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for delayed shipments have been received.

March order books are pretty well filled, but tonnage is available for April shipment. So far customers haven't shown much interest in third quarter needs. Some executives think bars will be in an easy market by the middle of the second quarter, with production for the period averaging 80 to 85 per cent of capacity.

Suppliers are watching developments in the auto industry closely.

Tubular Goods . . .

Tubular Goods Prices, Page 122

Few order cancellations have been reported since the strike threat was removed last month. Trunkline pipe is scheduled at capacity through June. While producers won't turn away third quarter orders, they're not yet soliciting business for that period.

Demand for 2 to 10 in. sizes of buttweld pipe is brisk, but producers are catching up on back orders.

In oil country goods, demand for 4½ and 5½ in. sizes of tubing and casing remains good and supply continues tight. Bigger sizes are loosening, partly due to cancellations by distributors because of tightening credit. On Feb. 20, a leading tubemaker will revert from 120 day terms to its "regular" policy: 2 per cent, 40 days.

With relatively few oil rigs operating, drill pipe business is almost nil.

Stainless Steel . . .

Stainless Steel Prices, Page 122

Production of stainless and heat resistant steel ingots gained last year despite the 116 day strike. Output was 1,126,793 net tons vs. 892,984 in 1958, reports the American Iron & Steel Institute. Output in the last half of the year amounted to 387,029 tons, down sharply from the 739,764 tons produced in the first six months. In the last half of 1958, output totaled 513,805 tons.

Tool Steel . . .

Tool Steel Prices, Page 122

Shipments of tool steels (excluding hollow drill steel) in November totaled 8376 net tons, reports the American Iron & Steel Institute.

The total compares with 6207 tons in October, 5397 tons in September, 5044 tons in August, months for which data have been unavailable until now because of the steel strike. In November, 1958, output was 6601 net tons.

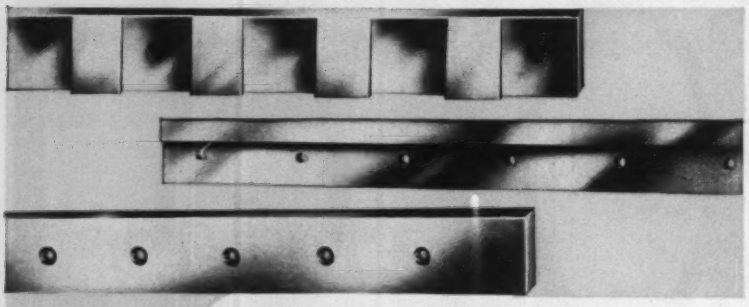
The total movement of tool steels in the first 11 months of 1959 was 86,859 tons compared with 63,435 in the like period of 1958.

Plates . . .

Plate Prices, Page 116

While first quarter plate allocations looked skimpy at the outset of the period, few consumers have been inconvenienced to any marked degree. With better production and slower demand from some large areas of consumption, platemakers are now offering tonnage for March and April deliveries. In some cases, they're seeking to ship April and May tonnage ahead of schedule.

Because they've been receiving shipments faster and in larger amounts than they had anticipated,



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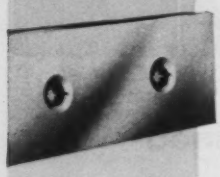

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service centers are trying to unload surplus tonnage. One big Pittsburgh consumer says distributors are offering plates at mill prices.

Buyers think prices will rise this year (about $5 a ton), but few indicate they'll do any hedging.

Alan Wood Steel Co. has awarded 4800 tons of structurals for a new, 110 in. plate mill.

Molysulfide Prices Cut

Prices on molysulfide lubricant products were reduced 15 cents a pound across the board Feb. 1 by Climax Molybdenum Co., a division of American Metal Climax Inc., New York. The reductions average 10.7 per cent. The base price for domestic resale of molysulfide technical is now $1.15 per pound. Technical-fine is $1.35.

Succinic Anhydride Cut

National Aniline Div., Allied Chemical Corp., New York, last week reduced the price of succinic anhydride 23 cents a pound. It's now quoted 51 cents a pound in truckloads and 52 cents less than truckloads.

Ferroalloys . . .

Ferroalloy Prices, Page 125

Pittsburgh Metallurgical Co. Inc. reports sales and shipments of ferroalloys from its three plants have rebounded sharply, preliminary figures indicating December shipments were the largest for any month in the company's history.

Pittsburgh Metallurgical has just let contracts for another electric arc furnace at its Calvert City, Ky., plant.

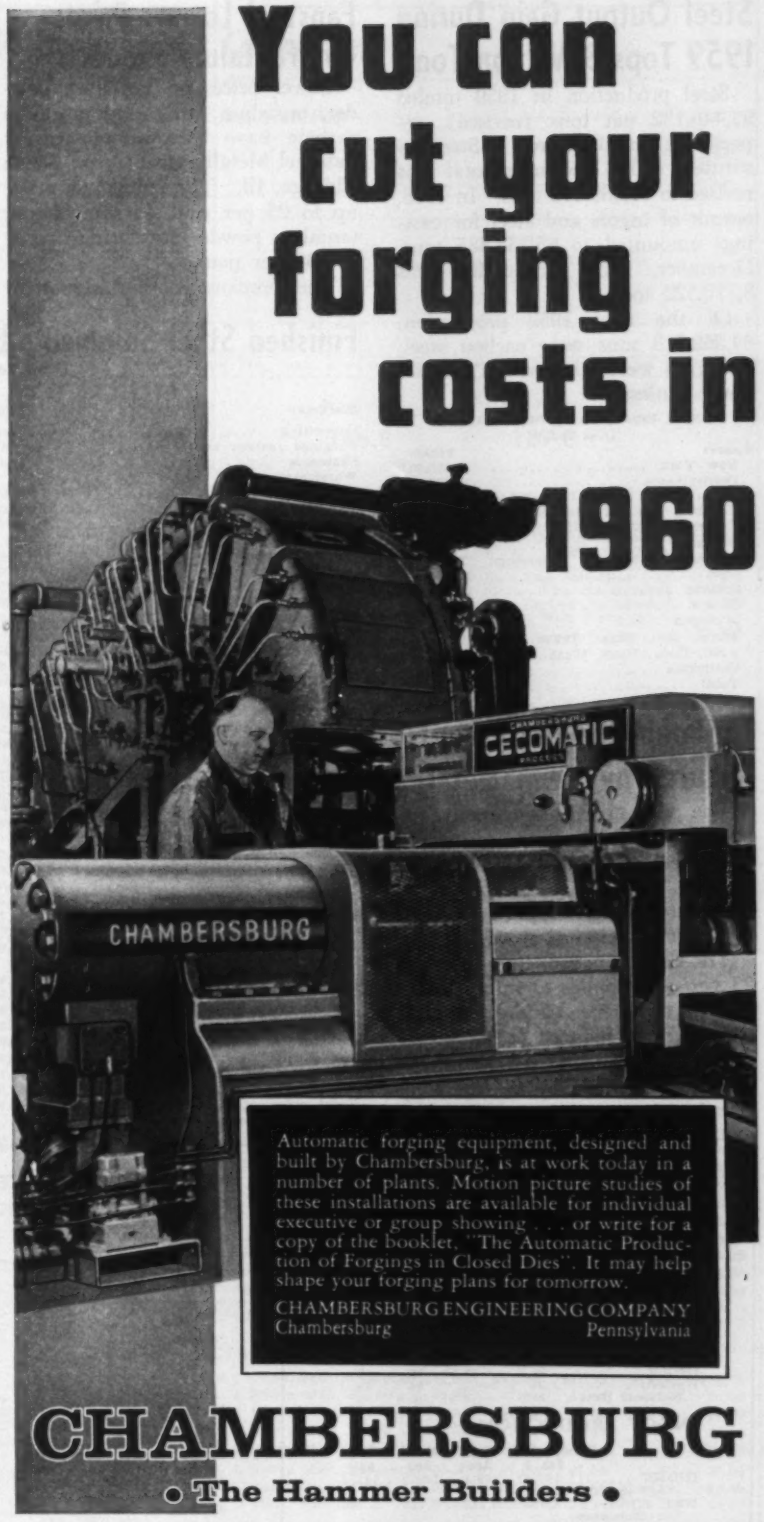
Distributors . . .

Prices, Page 123

Operators of steel service centers are not being pushed too much for any product, expect possibly sheets and strip. They have restored stocks almost to the 1959 prestrike level.

Some distributors reported a drop in business last month from the preceding month's total. They see no evidence of an immediate pickup.

Some steel imports are coming into the Pacific Northwest market, but the tonnage is expected to decline.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Steel Output Gain During 1959 Tops 8 Million Tons

Steel production in 1959 totaled 93,446,132 net tons (revised), reports the American Iron & Steel Institute. The December total was revised to 11,989,319 tons. In 1958, output of ingots and steel for castings amounted to 85,254,885 tons. December, 1958, production was 8,710,522 tons.

Of the total 1959 production, 84,562,513 tons were carbon steel, 7,754,373 were alloy, and 1,129,246 were stainless.

Steel Production by States—1959
(Net tons)

States:	Totals
New York	4,650,017
Pennsylvania	23,476,560
R. I., Conn., N. J., Del., Md...	6,039,490
Virginia, W. Virginia, Georgia, Florida	3,398,855
Kentucky	1,178,393
Alabama, Tennessee, Mississippi	3,167,862
Ohio	17,664,126
Indiana	11,601,731
Illinois	8,161,023
Michigan	5,637,363
Minn., Mo., Okla., Texas	2,911,133
Ariz., Colo., Utah, Wash., Oreg.	2,950,428
California	2,609,121
Total	93,446,132

Tantalum Powder Price Is Reduced by Kennametal

The price of capacitor grade tantalum powder has been reduced 14 to 23 per cent by Kennametal Inc., Latrobe, Pa. The reduction, effective immediately, applies to high and low capacitance powders.

The maximum reduction of about 23 per cent applies to shipments of 100 lb or more. In that bracket, the price was reduced to $47.50 per pound from $61.53. Prices of anodes manufactured by the company remain unchanged.

Fansteel Lowers Prices On Tantalum Products

Lower prices on tantalum powder, tantalum oxide, and tantalum carbide have been announced by Fansteel Metallurgical Corp., North Chicago, Ill. The reductions range up to 25 per cent on some items, tantalum powder now being quoted at $30 per pound.

The company also has announced a program to provide immediate shipment of tantalum products from stock.

Dr. Frank H. Briggs, Fansteel president, said the lower prices were made possible by a combination of factors, including increased production at the new Muskogee, Okla., plant. Other factors: Expanded facilities at North Chicago, and production economies from technical developments.

Finished Steel Shipments by Markets—November, 1959

(All grades; net tons)

	November		Total 11 Months	
Markets:	1959	1958	1959	1958
Converting	274,875	272,293	2,693,381	2,606,168
Forgings (except auto)	81,121	73,413	830,588	678,399
Fasteners	75,450	104,284	940,557	779,369
Warehouses:				
Oil & gas	113,089	107,365	1,706,751	891,646
All other	896,657	900,024	9,738,651	9,005,225
Total warehouse	1,009,746	1,007,389	11,445,402	9,896,871
Construction:				
Rail transportation	1,651	2,773	36,438	41,158
Oil & gas	114,606	125,680	2,046,133	1,990,012
All other	438,380	531,732	5,434,715	6,007,485
Total construction	554,637	660,185	7,517,286	8,038,655
Contractors' Products	261,513	311,799	3,150,525	3,167,796
Automotive:				
Cars, trucks, parts, etc.	943,612	1,140,386	12,033,791	8,552,112
Forgings	29,015	31,059	377,426	243,993
Total automotive	972,627	1,171,445	12,411,217	8,796,105
Rail Transportation:				
Rails, track, equipment	18,722	32,120	693,026	532,316
Cars & locomotives	118,176	65,957	1,369,767	775,649
Transit systems	942	1,109	18,823	18,508
Total rail transportation	137,840	99,186	2,081,616	1,326,473
Shipbuilding	37,730	61,401	571,354	731,933
Aircraft	5,104	5,758	61,109	55,484
Oil & gas drilling	22,087	28,194	479,476	274,490
Mining, quarrying, lumbering	15,969	13,358	199,856	163,410
Agricultural:				
Machinery	60,379	79,746	851,761	820,509
All other	18,679	20,471	269,172	270,538
Total agricultural	79,058	100,217	1,120,933	1,091,047
Machinery, equipt., tools	273,396	302,136	3,675,967	2,838,506
Elec. machinery, etc.	141,793	160,761	1,802,914	1,591,463
Appliances, etc.	127,864	165,790	1,625,537	1,409,834
Other equipment	134,689	153,102	1,615,292	1,560,472
Containers:				
Cans & closures	301,428	100,414	4,546,032	5,128,516
Barrels, drums, etc.	63,502	70,515	675,304	727,834
All other containers	39,682	48,587	463,657	466,037
Total containers	404,612	219,516	5,684,993	6,322,387
Ordnance & military	5,038	15,944	110,785	219,719
Nonclassified shipments	164,609	58,459	1,860,273	631,141
Total domestic shipments	4,779,758	4,984,630	59,879,061	52,179,722
Exports	61,863	202,251	1,290,160	2,236,464
Total shipments	4,841,621	5,186,881	61,169,221	54,416,186

Data from American Iron & Steel Institute.

DISTRICT INGOT RATES
(Percentage of capacity engaged)

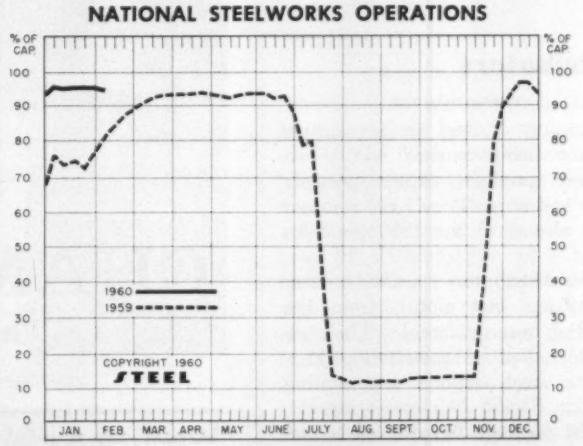
	Week Ended Feb. 7	Change	Same Week 1959	Same Week 1958
Pittsburgh	96.5	0	80	58.5
Chicago	95.5	+ 2*	86	59
Eastern	95	0	83	75
Youngstown	97	— 2	69	52
Wheeling	95.5	+ 0.5	81	57
Cleveland	100.5	— 0.5*	85.5	36
Buffalo	105	0	85.5	51.5
Birmingham	91.5	— 2	72.5	52.5
Cincinnati	100	+ 1*	91.5	41
St. Louis	97.5	— 4*	91.5	76
Detroit	74.5	—11.5*	76	53
Western	91	— 1	84	68
National Rate	94.5	— 0.9*	80.8	54

INGOT PRODUCTION

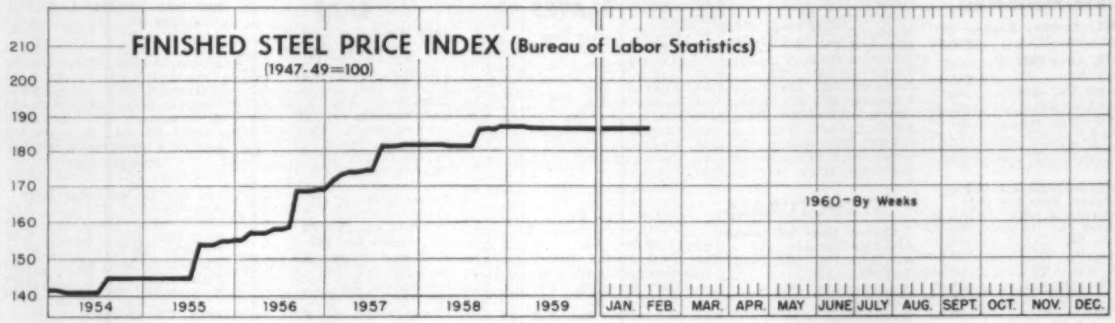
	Week Ended Feb. 7	Week Ago	Month Ago	Year Ago
INDEX (1947-49=100)	167.6†	169.1	169.0	142.4
NET TONS (In thousands)	2,693†	2,717	2,715	2,288

*Change from preceding week's revised rate.
†Estimated by STEEL; comparative figures reported by AISI.
Weekly capacity (net tons): 2,849,306 in 1960; 2,831,331 in 1959; 2,699,173 in 1958.

NATIONAL STEELWORKS OPERATIONS



Price Indexes and Composites



Feb. 2, 1960	Week Ago	Month Ago	Jan. Index	Year Ago
186.8	186.8	186.8	186.8	187.0

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Feb. 2

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825
Rails, Light, 40 lb	7.292
Tie Plates	6.875
Axles, Railway	10.175
Wheels, Freight Car, 33 in. (per wheel)	62.000
Plates, Carbon	6.350
Structural Shapes	6.167
Brass, Tool Steel, Carbon (lb)	0.560
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400
Bars, Tool Steel, H.R. Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.895
Bars, H.R., Alloy	10.775
Bars, H.R., Stainless, 303 (lb)	0.543
Bars, H.R., Carbon	6.675
Bars, Reinforcing	6.385
Bars, C.F., Carbon	10.710
Bars, C.F., Alloy	14.125
Bars, C.F., Stainless, 302 (lb)	0.570
Sheets, H.R., Carbon	6.350
Sheets, C.R., Carbon	7.300
Sheets, Galvanized	8.765
Sheets, C.R., Stainless, 302 (lb)	0.658
Sheets, Electrical	12.625
Strip, C.R., Carbon	9.489
Strip, C.R., Stainless, 430 (lb)	0.480
Strip, H.R., Carbon	6.250
Pipe, Black, Buttweld (100 ft)	19.905
Pipe, Galv., Buttweld (100 ft)	23.585
Pipe, Line (100 ft)	199.533
Casing, Oil Well, Carbon (100 ft)	201.080
Casing, Oil Well, Alloy (100 ft)	315.213
Tubes, Boiler (100 ft)	51.200
Tubing, Mechanical, Carbon (100 ft)	27.005
Tubing, Mechanical, Stainless, 304 (100 ft)	205.608
Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
Black Plate, Canmaking Quality (95 lb base box)	7.900
Wire, Drawn, Carbon	10.575
Wire, Drawn, Stainless, 430 (lb)	0.665
Bale Ties (bundles)	7.967
Nails, Wire, 8d Common	9.825
Wire, Barbed (80-rod spool)	8.758
Woven Wire Fence (20-rod roll)	21.793

STEEL's FINISHED PRICE INDEX*

	Feb. 3 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	247.82	194.53
Index in cents per lb	6.713	6.713	6.713	6.713	5.270

STEEL's ARITHMETICAL PRICE COMPOSITES*

Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$117.82
No. 2 Fdry, Pig Iron, GT.	66.49	66.49	66.49	66.49	56.54
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	56.04
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	57.27
Steelmaking Scrap, GT	42.00	42.33	41.33	42.50	35.25

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Feb. 3 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.30
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.30
Bars, H.R., deld. Philadelphia	5.975	5.975	5.975	5.975	4.55
Bars, C.R., Pittsburgh	7.65*	7.65*	7.65*	7.65*	5.40
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.25
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.25
Shapes, deld., Philadelphia	5.77	5.77	5.77	5.77	4.53
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.225
Plates, Chicago	5.30	5.30	5.30	5.30	4.225
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.225
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.225
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	4.225
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.05
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.05
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	4.95
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	4.95
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.10
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.45
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.05
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.05
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	5.75
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	5.85
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	5.90
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	5.75
Nails, Wire, Pittsburgh	8.95	8.95	8.95	8.95	6.85
Tin plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.65	$9.05

*Including 0.35c for special quality.

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$78.00
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$" Pitts.	6.40	6.40	6.40	6.40	4.675

PIG IRON, Gross Ton	Feb. 3 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$57.00
Basic, Valley	66.00	66.00	66.00	66.00	56.00
Basic, deld., Philadelphia	70.41	70.41	70.41	70.41	59.66
No. 2 Fdry, Neville Island, Pa.	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, deld., Phila.	70.91	70.91	70.91	70.91	55.16
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	52.88
No. 2 Fdry (Birm.) deld., Cin.	70.20	70.20	70.20	70.20	60.56
Malleable, Valley	66.50	66.50	66.50	66.50	56.50
Malleable, Chicago	66.50	66.50	66.50	66.50	56.50
Ferromanganese, net tons†	245.00	245.00	245.00	245.00	190.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$42.50	$42.50	$41.50	$43.50	$35.75
No. 1 Heavy Melt, E. Pa.	42.00	42.00	42.00	40.00	36.00
No. 1 Heavy Melt, Chicago	41.50	42.50	40.50	44.00	34.00
No. 1 Heavy Melt, Valley	47.50	47.50	44.50	49.50	36.50
No. 1 Heavy Melt, Cleve.	43.50	43.50	41.50	44.50	33.50
No. 1 Heavy Melt, Buffalo	36.50	37.50	37.50	41.50	30.50
Rails, Rerolling, Chicago	63.50	63.50	61.50	64.50	49.50
No. 1 Cast, Chicago	55.50	55.50	54.50	49.50	40.00

COKE, Net Ton					
Beehive, Furn., Connlsvl.	$15.00	$15.00	$15.00	$15.25	$13.75
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	18.25	16.75
Oven, Fdry., Milwaukee	32.00	32.00	32.00	32.00	25.25

Steel Prices

Mill prices as reported to STEEL, Feb. 3, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 117; footnotes, page 121.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 .....$76.00

INGOTS, Alloy (NT)
Detroit S41 .....$82.00
Economy,Pa. B14 .....82.00
Farrell,Pa. S3 .....82.00
Lowellville,O. S3 .....82.00
Midland,Pa. C18 .....82.00
Munhall,Pa. U5 .....82.00
Sharon,Pa. S3 .....82.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bartonville,Ill. K4 ...$82.00
Bessemer,Pa. U5 .....80.00
Buffalo R2 .....80.00
Clairton,Pa. U5 .....80.00
Ensley,Ala. T2 .....80.00
Fairfield,Ala. T2 .....80.00
Fontana,Calif. K1 .....90.50
Gary,Ind. U5 .....80.00
Johnstown,Pa. B2 .....80.00
Lackawanna,N.Y. B2 .80.00
Munhall,Pa. U5 .....80.00
Owensboro,Ky. G8 ....80.00
S.Chicago,Ill. R2, U5 ..80.00
S.Duquesne,Pa. U5 ...80.00
Sterling,Ill. N15 .....80.00
Youngstown R2 .....80.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$99.50
Buffalo R2 .....99.50
Canton,O. R2 .....102.00
Clairton,Pa. U5 .....99.50
Conshohocken,Pa. A3 .104.50
Ensley,Ala. T2 .....99.50
Fairfield,Ala. T2 .....99.50
Farrell,Pa. S3 .....99.50
Fontana,Calif. K1 ....109.00
Gary,Ind. U5 .....99.50
Geneva,Utah C11 .....99.50
Houston S5 .....104.50
Johnstown,Pa. B2 ....99.50
Lackawanna,N.Y. B2 .99.50
LosAngeles B3 .....109.00
Midland,Pa. C18 .....99.50
Munhall,Pa. U5 .....99.50
Owensboro,Ky. G8 ....99.50
Seattle B3 .....109.00
Sharon,Pa. S3 .....99.50
S.Chicago R2, U5, W14 99.50
S.Duquesne,Pa. U5 ....99.50
S.SanFrancisco B3 ....109.00
Warren,O. C17 .....99.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ...$119.00
Bridgeport,Conn. C32..119.00
Buffalo R2 .....119.00
Canton,O. R2, T7 ....119.00
Conshohocken,Pa. A3..126.00
Detroit S41 .....119.00
Economy,Pa. B14 ....119.00
Farrell,Pa. S3 .....119.00
Fontana,Calif. K1 ....140.00
Gary,Ind. U5 .....119.00
Houston S5 .....124.00
Ind.Harbor,Ind. Y1 ...119.00
Johnstown,Pa. B2 ....119.00
Lackawanna,N.Y. B2..119.00
LosAngeles B3 .....139.00
Lowellville,O. S3 .....119.00
Massillon,O. R2 .....119.00
Midland,Pa. C18 .....119.00
Munhall,Pa. U5 .....119.00
Owensboro,Ky. G8 ....119.00
Sharon,Pa. S3 .....119.00
S.Chicago R2,U5,W14 119.00
S.Duquesne,Pa. U5 ...119.00
Struthers,O. Y1 .....119.00
Warren,O. C17 .....119.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 .....$122.50
Canton,O. R2 .....125.00
Cleveland R2 .....122.50
Gary,Ind. U5 .....122.50
S.Chicago,Ill. R2, W14 122.50
S.Duquesne,Pa. U5 ..122.50
Warren,O. C17 .....122.50

SKELP
Aliquippa,Pa. J5 .....5.05
Ind.Harbor,Ind. Y1 ....5.05
Munhall,Pa. U5 .....5.05
Pittsburgh J5 .....5.05
Warren,O. R2 .....5.05
Youngstown R2, U5 ....5.05

WIRE RODS
AlabamaCity,Ala. R2 ..6.40
Aliquippa,Pa. J5 .....6.40
Alton,Ill. L1 .....6.60
Bartonville,Ill. K4 ....6.50
Buffalo W12 .....6.40
Cleveland A7 .....6.40
Donora,Pa. A7 .....6.40
Fairfield,Ala. T2 .....6.40
Houston S5 .....6.65
IndianaHarbor,Ind. Y1 ..6.40
Johnstown,Pa. B2 ....6.40
Joliet,Ill. A7 .....6.40
KansasCity,Mo. S5 ....6.65
Kokomo,Ind. C16 .....6.50
LosAngeles B3 .....7.20
Minnequa,Colo. C10 ....6.65
Monessen,Pa. P7 .....6.40
Pittsburg,Calif. C11 ....7.20
Portsmouth,O. P12 ....6.40
Roebling,N.J. R5 .....6.50
S.Chicago Ill. R2, W14 ..6.40
SparrowsPoint,Md. B2 ..6.50
Sterling,Ill(1) N15 ....6.40
Sterling,Ill. N15 .....6.50
Struthers,O. Y1 .....6.40
Worcester,Mass. A7 ....6.70

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2 ..5.50
Aliquippa,Pa. J5 .....5.50
Atlanta A11 .....5.70
Bessemer,Ala. T2 .....5.50
Bethlehem,Pa. B2 .....5.55
Birmingham C15 .....5.50
Clairton,Pa. U5 .....5.50
Fairfield,Ala. T2 .....5.50
Fontana,Calif. K1 .....6.30
Gary,Ind. U5 .....5.50
Geneva,Utah C11 .....5.50
Houston S5 .....5.60
Ind.Harbor Ind. I-2, Y1..5.50
Johnstown,Pa. B2 .....5.55
Joliet,Ill. P22 .....5.50
KansasCity,Mo. S5 ....5.60
Lackawanna,N.Y. B2 ..5.55
LosAngeles B3 .....6.20
Minnequa,Colo. C10 ....5.80
Munhall Pa. U5 .....5.50
Niles,Calif. P1 .....6.25
Phoenixville,Pa. P4 ....5.55
Portland,Oreg. O4 ....6.25
Seattle B3 .....6.25
S.Chicago, Ill. U5, W14..5.50
S.SanFrancisco B3 ....6.15
Sterling,Ill. N15 .....5.50
Torrance,Calif. C11 ....6.20
Weirton,W.Va. W6 ....5.50

Wide Flange
Bethlehem Pa. B2 .....5.55
Clairton,Pa. U5 .....5.50
Fontana,Calif. K1 ....6.45
IndianaHarbor,Ind. I-2..5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 .....5.50
Phoenixville,Pa. P4 ....5.55
S.Chicago,Ill. U5 .....5.50
Sterling,Ill. N15 .....5.50
Weirton,W.Va. W16 ....5.50

Alloy Std. Shapes
Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....6.90
Munhall, Pa. U5 .....6.80
S.Chicago,Ill. U5, W14..6.80

H.S., L.A., Std. Shapes
Aliquippa,Pa. J5 .....8.05
Bessemer Ala. T2 .....8.05
Bethlehem,Pa. B2 .....8.10
Clairton,Pa. U5 .....8.05
Fairfield,Ala. T2 .....8.05
Fontana,Calif. K1 ....8.85
Gary,Ind. U5 .....8.05
Geneva,Utah C11 .....8.05
Houston S5 .....8.15
Ind.Harbor Ind. I-2, Y1.8.05
Johnstown,Pa. B2 .....8.10
KansasCity,Mo. S5 ....8.15
Lackawanna,N.Y. B2 ..8.10
LosAngeles B3 .....8.75
Munhall,Pa. U5 .....8.05
Seattle B3 .....8.80
S.Chicago,Ill. U5, W14..8.05
S.SanFrancisco B3 ....8.70
Sterling,Ill. N15 .....7.75
Struthers,O. Y1 .....8.05

H.S., L.A., Wide Flange
Bethlehem,Pa. B2 .....8.10
Ind.Harbor,Ind. I-2 ....8.05
Lackawanna,N.Y. B2 ..8.10
Munhall,Pa. U5 .....8.05
S.Chicago,Ill. U5 .....8.05
Sterling,Ill. N15 .....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 .....5.55
Ind.Harbor,Ind. I-2 ....5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 .....5.50
S.Chicago,Ill. I-2, U5 ..5.50

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ....6.50
Lackawanna,N.Y. B2 ..6.50
Munhall Pa. U5 .....6.50
S.Chicago,Ill. I-2, U5 ..6.50
Weirton,W.Va. W6 ....6.50

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..5.30
Aliquippa,Pa. J5 .....5.30
Ashland,Ky.(15) A10 ..5.30
Atlanta A11 .....5.50
Bessemer,Ala. T2 .....5.30
Clairton,Pa. U5 .....5.30
Claymont,Del. C22 ....5.30
Cleveland J5, R2 .....5.30
Coatesville,Pa. L7 ....5.30
Conshohocken,Pa. A3 ..5.30
Ecorse,Mich. G5 .....5.30
Fairfield,Ala. T2 .....5.30
Farrell,Pa. S3 .....5.30
Fontana,Calif.(30) K1 ..6.10
Gary,Ind. U5 .....5.30
Geneva,Utah C11 .....5.30
GraniteCity,Ill. G4 ....5.40
Harrisburg,Pa. P4 .....5.30
Houston S5 .....5.40
Ind.Harbor,Ind. I-2, Y1.5.30
Johnstown,Pa. B2 .....5.30
Lackawanna,N.Y. B2 ..5.30
Mansfield,O. E6 .....5.30
Minnequa,Colo. C10 ....6.15
Munhall,Pa. U5 .....5.30
Newport,Ky. A2 .....5.30
Pittsburgh J5 .....5.30
Riverdale,Ill. A1 .....5.30
Seattle B3 .....6.20
Sharon Pa. S3 .....5.30
S.Chicago,Ill. U5, W14..5.30
SparrowsPoint,Md. B2..5.30
Sterling,Ill. N15 .....5.30
Steubenville,O. W10 ....5.30
Warren,O. R2 .....5.30
Youngstown U5, Y1 ....5.30
Youngstown(27) R2 ....5.30

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 ....7.05
Fontana,Calif. K1 .....7.85
Geneva,Utah C11 .....7.05
Houston S5 .....7.15
Johnstown,Pa. B2 .....7.05
SparrowsPoint,Md. B2 ..7.05

PLATES, Wrought Iron
Economy,Pa. B14 .....14.10

PLATES, H.S., L.A.
Aliquippa,Pa. J5 .....7.95
Ashland,Ky. A10 .....7.95
Bessemer,Ala. T2 .....7.95
Clairton,Pa. U5 .....7.95
Claymont,Del. C22 .....7.95
Cleveland J5, R2 .....7.95
Coatesville,Pa. L7 .....7.95
Conshohocken,Pa. A3 ...7.95
Economy,Pa. B14 .....7.95
Ecorse,Mich. G5 .....7.95
Fairfield,Ala. T2 .....7.95
Farrell,Pa. S3 .....7.95
Fontana,Calif.(30) K1..8.75
Gary,Ind. U5 .....7.95
Geneva,Utah C11 .....7.95
Houston S5 .....8.05
Ind.Harbor,Ind. I-2, Y1.7.95
Johnstown,Pa. B2 .....7.95
Munhall Pa. U5 .....7.95
Pittsburgh J5 .....7.95
Seattle B3 .....8.85
Sharon,Pa. S3 .....7.95
S.Chicago,Ill. U5, W14..7.95
SparrowsPoint,Md. B2..7.95
Warren,O. R2 .....7.95
Youngstown U5, Y1 ....7.95

PLATES, Alloy
Aliquippa,Pa. J5 .....7.50
Claymont,Del. C22 .....7.50
Coatesville,Pa. L7 .....7.50
Economy,Pa. B14 .....7.50
Farrell,Pa. S3 .....7.50
Fontana,Calif. K1 .....8.30
Gary,Ind. U5 .....7.50
Houston S5 .....7.60
Ind.Harbor,Ind. Y1 ....7.50
Johnstown,Pa. B2 .....7.50
Lowellville O. S3 .....7.50
Munhall,Pa. U5 .....7.50
Newport,Ky. A2 .....7.50
Pittsburgh J5 .....7.50
Seattle B3 .....8.40
Sharon,Pa. S3 .....7.50
S.Chicago,Ill. U5, W14..7.50
SparrowsPoint, Md. B2..7.50
Youngstown Y1 .....7.50

FLOOR PLATES
Cleveland J5 .....6.375
Conshohocken,Pa. A3..6.375
Ind.Harbor,Ind. I-2 ...6.375
Munhall,Pa. U5 .....6.375
Pittsburgh J5 .....6.375
S.Chicago,Ill. U5 .....6.375

PLATES, Ingot Iron
Ashland c.l. (15) A10 ..5.55
Ashland l.c.l. (15) A10 ..6.05
Cleveland c.l. R2 .....6.05
Warren,O. R2 .....6.05

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ...5.675
Aliquippa,Pa.(9) J5 ....5.675
Alton,Ill. L1 .....5.875
Atlanta(9) A11 .....5.875
Bessemer,Ala.(9) T2 ...5.675
Birmingham(9) C15 ....5.675
Buffalo(9) R2 .....5.675
Canton,O.(23) R2 .....6.15
Clairton,Pa.(9) U5 ....5.675
Cleveland(9) R2 .....5.675
Ecorse,Mich.(9) G5 ....5.675
Emeryville,Calif. J7 ..6.425
Fairfield,Ala.(9) T2 ...5.675
Fairless,Pa.(9) U5 ....5.825
Fontana,Calif.(9) K1 ..6.375
Gary,Ind.(9) U5 .....5.675
Houston(9) S5 .....5.925
Ind.Harbor(9) I-2, Y1..5.675
Johnstown,Pa.(9) B2 ...5.675
Joliet,Ill. P2 .....5.675
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
LosAngeles(9) B3 .....6.375
Massillon,O.(23) R2 ...6.15
Midland,Pa. (23) C18 ..6.025
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ...6.125
Niles Calif. P1 .....6.375
Owensboro,Ky.(9) G8..6.025
Pittsburg,Calif.(9) C11.6.375
Pittsburgh(9) J5 .....5.675
Portland,Oreg. O4 ....6.425
Riverdale,Ill.(9) A1 ...5.675
Seattle A24, B3, N15 ..6.425
S.Ch'c'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5..5.675
S.SanFran.,Calif.(9)B3 6.425
Sterling,Ill.(1)(9) N15 .5.675
Sterling,Ill.(9) N15 ....5.775
Struthers,O.(9) Y1 ....5.675
Tonawanda,N.Y. B12 ...5.675
Torrance,Calif.(9) C11 ..6.375
Warren O. C17 .....6.052
Youngstown(9) R2,U5..5.675

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.725
Bethlehem,Pa. B2 .....6.725
Bridgeport,Conn. C32 ..6.80
Buffalo R2 .....6.725
Canton,O. R2, T7 .....6.725
Clairton,Pa. U5 .....6.725
Detroit S41 .....6.725
Economy,Pa. B14 .....6.725
Ecorse,Mich. G5 .....6.725
Fairless,Pa. U5 .....6.875
Farrell,Pa. S3 .....6.725
Fontana,Calif. K1 .....7.775
Gary,Ind. U5 .....6.725
Houston S5 .....6.975
Ind.Harbor,Ind. I-2, Y1 6.725
Johnstown,Pa. B2 .....6.725
KansasCity,Mo. S5 ....6.975
Lackawanna,N.Y. B2 ..6.725
LosAngeles B3 .....7.775
Lowellville,O. S3 .....6.725
Massillon,O. R2 .....6.725
Midland,Pa. C18 .....6.725
Owensboro,Ky. G8 .....6.725
Pittsburgh J5 .....6.725
Sharon,Pa. S3 .....6.725
S.Chicago R2, U5, W14..6.725
S.Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 .....6.725
Warren,O. C17 .....6.725
Youngstown U5 .....6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa,Pa. J5 .....8.30
Bessemer,Ala. T2 .....8.30
Bethlehem,Pa. B2 .....8.30
Clairton,Pa. U5 .....8.30
Cleveland R2 .....8.30
Ecorse,Mich. G5 .....8.30
Fairfield,Ala. T2 .....8.30
Fontana,Calif. K1 .....9.00
Gary,Ind. U5 .....8.30
Houston S5 .....8.55
Ind.Harbor,Ind. Y1 ....8.30
Johnstown,Pa. B2 .....8.30
KansasCity,Mo. S5 ....8.55
Lackawanna,N.Y. B2 ..8.30
LosAngeles B3 .....9.00
Pittsburgh J5 .....8.30
Seattle B3 .....9.05
S.Chicago,Ill. R2 W14..8.30
S.Duquesne,Pa. U5 ....8.30
S.SanFrancisco B3 ....9.05
Struthers,O. Y1 .....8.30
Youngstown U5 .....8.30

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.825
Houston(9) S5 .....5.925
KansasCity,Mo.(9) S5 .5.925
Lackawanna(9) B2 ....5.675
Sterling Ill. N15 .....5.775
Sterling,Ill.(1) N15 ....5.675
Tonawanda,N.Y. B12 ...5.675

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 .....5.675
Atlanta A11 .....5.875
Joliet,Ill. P22 .....5.675
Minnequa,Colo. C10 ....6.125
Niles,Calif. P1 .....6.375
Portland,Oreg. O4 ....6.425
SanFrancisco S7 .....6.52
Seattle B3 .....6.425

BAR SIZE ANGLES; S. SHAPES Wrought Iron
Economy, Pa. B14 ....16.45

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....7.05
KansasCity,Mo. S5 ....7.05
Pittsburgh J5 .....6.80
Youngstown U5 .....6.80

BARS, C.F. Loaded (including loaded extra)
Carbon
LosAngeles P2, S30 ..11.75*
Alloy
Ambridge,Pa. W18 ...10.175
BeaverFalls,Pa. M12..10.175
Camden,N.J. P13 .....10.35
Chicago W18 .....10.175
Elyria,O. W8 .....10.175
Monaca,Pa. S17 .....10.175
Newark,N.J. W18 .....10.35
SpringCity,Pa. K3 ....10.35

*Grade A; add 0.05c for Grade B.

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 .....7.65
BeaverFalls,Pa. M12,R2.7.65
Birmingham C15 .....8.25
Buffalo B5 .....7.70
Camden,N.J. P13 .....8.10
Carnegie,Pa. C12 .....7.65
Chicago W18 .....7.65
Cleveland A7, C20 .....7.65
Detroit B5, P17 .....7.85
Detroit S41 .....7.65
Donora,Pa. A7 .....7.65
Elyria,O. W8 .....7.65
FranklinPark,Ill. N5 ....7.65
Gary,Ind. R2 .....7.65
GreenBay,Wis. F7 .....7.65
Hammond,Ind. J5, L2..7.65
Hartford,Conn. R2 .....8.15
Harvey,Ill. B5 .....7.65
LosAngeles(49) S30 ....9.10
LosAngeles(49) P2, R2..9.10
Mansfield,Mass. B5 ....8.20
Massillon,O. R2, R8 ....7.65
Midland,Pa. C18 .....7.65
Monaca,Pa. S17 .....7.65
Newark,N.J. W18 .....8.10
NewCastle,Pa.(17) B4 ..7.65
Pittsburgh J5 .....7.65
Plymouth,Mich. P5 ....7.90
Putnam,Conn. W18 ....8.20
SpringCity,Pa. K3 ....8.10
Struthers O. Y1 .....7.65
Warren,O. C17 .....7.65
Waukegan,Ill. A7 .....7.65
Willimantic,Conn. J5 ...8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19..8.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 .....9.025
BeaverFalls,Pa.M12,R2 9.025
Bethlehem,Pa. B2 .....9.025
Bridgeport,Conn. C32 ..9.175
Buffalo B5 .....9.025
Camden,N.J. P13 .....9.20
Canton,O. T7 .....9.025
Carnegie,Pa. C12 .....9.025
Chicago W18 .....9.025
Cleveland A7, C20 .....9.025
Detroit B5, P17 .....9.225
Detroit S41 .....9.025
Donora,Pa. A7 .....9.025
Elyria,O. W8 .....9.025
FranklinPark,Ill. N5 ..9.025
Gary,Ind. R2 .....9.025
GreenBay,Wis. F7 .....9.025
Hammond,Ind. J5, L2..9.025
Hartford,Conn. R2 .....9.325
Harvey,Ill. R5 .....9.025
Lackawanna,N.Y. B2 ..9.025
LosAngeles P2, S30 ...11.00
Mansfield,Mass. B5 ...9.325
Massillon,O. R2, R8 ...9.025
Midland,Pa. C18 .....9.025
Monaca,Pa. S17 .....9.025
Newark N.J. W18 .....9.20
Plymouth,Mich. P5 ....9.225
S.Chicago,Ill. W14 ....9.025
SpringCity,Pa. K3 ....9.20
Struthers,O. Y1 .....9.025
Warren,O. C17 .....9.025

Waukegan,Ill. A7 ....9.025
Willimantic,Conn. J5 ..9.325
Worcester,Mass. A7 ...9.325
Yougstown F3, Y1 ...9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.675
Birmingham C15 .....5.675
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala. T2 .....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 .....6.375
Ft.Worth,Tex(4)(26)T4 5.925
Gary,Ind. U5 .....5.675
Houston S5 .....5.925
Ind.Harbor,Ind. I-2,Y1 5.675
Johnstown,Pa. B2 ....5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ....5.925
Kokomo,Ind. C16 ....5.775
Lackawanna,N.Y. B2 .5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ..6.125
Niles,Calif. P1 .....6.375
Pittsburg,Calif. C11 ..6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
SandSprings,Okla. S5 ..5.925
Seattle A24, B3, N14 .6.425
S.Chicago,Ill. R2, W14.5.675
S.Duquesne,Pa. U5 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2..5.675
Sterling,Ill. (1) N15 ..5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ...6.10
Torrance,Calif. C11 ...6.375
Youngstown R2, U5 ..5.675

BARS, Reinforcing, Billet (Fabricated: To Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.60
Johnstown,Pa. B2 .....7.33
KansasCity,Mo. S5 ....7.60
Lackawanna,N.Y. B2 ...7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
SandSprings,Okla. S5 ...7.60
Seattle A24, B3, N14 ..7.95
SparrowsPt.,Md. B2 ....7.33
St.Paul U8 .....8.17
Williamsport,Pa. S19 ...7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 15.10
Economy,Pa.(D.R.)B14 19.30
Econ.(DirectRolled)B14 13.55
Economy(Staybolt)B14 19.80
McK.Rks.(S.R.) L5 ...14.50
McK.Rks.(D.R.) L5 ...19.80
McK.Rks.(Staybolt)L5. 20.95

BARS, Rail Steel

ChicagoHts.(3) C2, I-2.5.575
ChicagoHts.(4)(44) I-2 5.675
ChicagoHts. (4) C2 ....5.675
Franklin,Pa. (3) F5 ..5.575
Franklin,Pa.(4) F5 ....5.675
JerseyShore,Pa.(3) J8 ..5.55
Marion,O. (3) P11 ....5.575
Tonawanda (3) B12 ...5.575
Tonawanda(4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ..5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit(8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 .....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ...5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 ....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14 ..5.10
SparrowsPoint,Md. B2 ..5.10
Steubenville,O. W10 ..5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 ....6.275

SHEETS, H.R., Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 ....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ..7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14.7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ...7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky. (8) A10 ..5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 ....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ....7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparowsPoint,Md. B2 ..6.275
Steubenville,O. W10 ...6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 .....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(37) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(38) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.225	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.225	....
Fairfield,Ala. T2	7.225	7.475
Gary,Ind. U5	7.225	7.475
GraniteCity,Ill. G4	7.325	....
Ind.Harbor I-2	7.225	7.475
Irvin,Pa. U5	7.225	7.475
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.225	7.475
Pitts.,Calif. C11	7.975	....
Pittsburgh J5	7.225	....
SparrowsPt. B2	7.225	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2....7.475

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2.6.875†
Ashland,Ky. A10 ....6.875†
Canton,O. R2 .....6.875†
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 ....6.875†
Gary,Ind. U5 .....6.875*
GraniteCity,Ill. G4 ...6.975*
Ind.Harbor,Ind. I-2 ..6.875*
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C-16 ....6.975†
MartinsFerry,O. W10..6.875*
Middletown,O. A10 ..6.875†
Pittsburg, Calif. C11 ..7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ..'6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.275
Irvin,Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 ....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.65
Niles,O.(28) R2 .....7.65
Weirton,W.Va. W6 ....7.50
Youngstown J5 .....7.50

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625
Irvin,Pa. U5 (type 1) ..9.525

SHEETS, Enameling Iron

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
Ind,Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Follansbee,W.Va. F4 ...8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom,W.Va.W10 7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 ....7.225
Warren,O. R2 .....7.225
Weirton,W.Va. W6 ....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

Key To Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U.S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co., Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E5 Elliott Bros. Steel Co.
E6 Empire-Reeves Steel
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div. Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J&L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America
T2 Tenn. Coal & Iron
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope Corp.
U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ..5.10
Allenport,Pa. P7 .....5.10
Alton,Ill. L1 .....5.30
Ashland,Ky.(8) A10 ....5.10
Atlanta A11 .....5.10
Bessemer,Ala. T2 .....5.10
Birmingham C15 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 .....5.825
Gary,Ind. U5 .....5.10
Ind.Harbor,Ind. I-2, Y1..5.10
Johnstown,Pa.(25) B2...5.10
Lackaw'na,N.Y.(25) B2.5.10
LosAngeles(25) B3 .....5.85
LosAngeles C1 .....5.60
Minnequa,Colo. C10 ....6.20
Riverdale,Ill. A1 .....5.10
San Francisco S7 .....6.60
Seattle(25) B3 .....6.10
Seattle N14 .....6.60
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. W14 .....5.10
S.SanFrancisco(25) B3..5.85
SparrowsPoint,Md. B2 ..5.10
Torrance,Calif. C11 ....5.85
Warren,O. R2 .....5.10
Weirton,W.Va. W6 .....5.10
Youngstown U5 .....5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18 .....8.40
Farrell,Pa. S3 .....8.40
Gary,Ind. U5 .....8.40
Houston S5 .....8.65
Ind.Harbor,Ind. Y1 ....8.40
KansasCity,Mo. S5 ....8.65
LosAngeles B3 .....9.60
Lowellville,O. S3 .....8.40
Newport,Ky. A2 .....8.40
Sharon,Pa. A2, S3 .....8.40
S.Chicago,Ill. W14 .....8.40
Youngstown U5, Y1 ....8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky., A10 .....7.575
Bessemer,Ala. T2 .....7.575
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.575
Fairfield,Ala. T2 .....7.575
Farrell,Pa. S3 .....7.575
Gary,Ind. U5 .....7.575
Ind.Harbor,Ind. I-2, Y1 7.575
Lackawanna,N.Y. B2 ..7.575
LosAngeles(25) B3 ....8.325
Seattle(25) B3 .....8.575
Sharon,Pa. S3 .....7.575
S.Chicago,Ill. W14 ....7.575
S.SanFrancisco(25) B3.8.325
SparrowsPoint,Md. B2..7.575
Warren,O. R2 .....7.575
Weirton,W.Va. W6 ....7.575
Youngstown U5, Y1 ...7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ...5.35
Warren,O. R2 .....5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 .....7.425
Baltimore T6 .....7.425
Boston T6 .....7.975
Buffalo S40 .....7.425
Cleveland A7, J5 .....7.425
Dearborn,Mich. S3 ....7.425
Detroit D2, M1, P20...7.425
Dover,O. G6 .....7.425
Evanston,Ill. M22 .....7.525
Farrell,Pa. S3 .....7.425
Follansbee,W.Va. W10..7.425
Fontana,Calif. K1 .....9.20
FranklinPark,Ill. T6 ..7.525
Ind.Harbor,Ind. Y1 ....7.425
Indianapolis S41 .....7.575
LosAngeles C1, S41 ....9.30
McKeesport,Pa. E10 ...7.525
NewBedford,Mass. R10.7.875
NewBritain,Conn. S15..7.875
NewCastle,Pa. B4, E5..7.425
NewHaven,Conn. D2 ...7.875
NewKensington,Pa. A6.7.425
Pawtucket,R.I. R3 ....7.975
Pawtucket,R.I. N8 ....7.975
Philadelphia P24 .....7.875
Pittsburgh J5 .....7.425
Riverdale,Ill. A1 .....7.525
Rome,N.Y.(32) R6 ....7.425
Sharon,Pa. S3 .....7.425
Trenton,N.J.(31) R5 ..8.875
Wallingford,Conn. W2..7.875
Warren,O. R2, T5 ....7.425
Worcester,Mass. A7 ...7.975

STRIP, Cold-Rolled Alloy

Boston T6 .....15.90
Carnegie,Pa. S18 .....15.55
Cleveland A7 .....15.55
Dover,O. G6 .....15.55
Farrell,Pa. S3 .....15.55
FranklinPark,Ill. T6 ..15.55
Harrison,N.J. S18 .....15.55
Indianapolis S41 .....15.70
LosAngeles S41 .....17.75
Lowellville,O. S3 .....15.55
Pawtucket,R.I. N8 ....15.90
Riverdale,Ill. A1 .....15.55
Sharon,Pa. S3 .....15.55
Worcester,Mass. A7....15.85
Youngstown S41 .....15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7 .....10.80
Dearborn,Mich. S3 ....10.80
Dover,O. G6 .....10.80
Farrell,Pa. S3 .....10.80
Ind.Harbor,Ind. Y1 ...10.80
Sharon,Pa. S3 .....10.80
Warren,O. R2 .....10.80

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	8.95	10.40	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, E5	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	9.85	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y. R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	....	10.70	12.90	15.90	18.85
Wallingford,Conn. W2	9.40	10.70	12.90	15.90	18.75
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)	0.80C	1.05C	1.35C
Bristol,Conn. W1	18.85	22.95	27.80
Buffalo W12	18.85	....	....
Fostoria,O. S1	19.05	22.15	....
FranklinPark,Ill. T6	19.20	23.30	28.15
Harrison,N.J. C18	18.85	22.95	27.80
NewYork W3	18.85	22.95	27.80
Palmer,Mass. W12	18.85	....	....
Trenton,N.J. R5	18.85	22.95	27.80
Worcester,Mass. A7, T6	18.85	22.95	27.80
Youngstown S41	19.20	23.30	28.15

Weirton,W.Va. W6 ....10.80
Youngstown Y1 .....10.80

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....8.175

STRIP, C.R. Electrogalvanized

Cleveland A7 .....7.425*
Dover,O. G6 .....7.425*
Evanston,Ill. M22 .....7.525*
McKeesport,Pa. E10 ..7.50*
Riverdale,Ill. A1 .....7.525*
Warren,O. B9, S3, T5..7.425*
Worcester,Mass. A7 ...7.975
Youngstown S41, Y1..7.425*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Farrell,Pa. S3 .....7.50
Sharon,Pa. S3 .....7.50

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.65
Farrell,Pa. S3 .....5.525
Riverdale,Ill. A1 .....5.675
Sharon,Pa. S3 .....5.525
Youngstown U5 .....5.525

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$9.10	$9.35	$9.75
Fairfield,Ala. T2	9.20	9.45	9.85
Fairless,Pa. U5	9.20	9.45	9.85
Fontana,Calif. K1	9.75	10.00	10.40
Gary,Ind. U5	9.10	9.35	9.75
GraniteCity,Ill. G4	9.20	9.45	9.60
IndianaHarbor,Ind. I-2, Y1	9.10	9.35	9.75
Irvin,Pa. U5	9.10	9.35	9.75
Niles,O. R2	9.10	9.35	9.75
Pittsburg,Calif. C11	9.75	10.00	10.40
SparrowsPoint,Md. B2	9.10	9.35	9.75
Weirton,W.Va. W6	9.10	9.35	9.75
Yorkville,O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)			
Aliquippa,Pa. J5 (21-27 Ga.)	7.90	8.10	....
IndianaHarbor,Ind. Y1 (20-27 Ga.)	7.90	....	....
Niles,O. R2 (20-27 Ga.)	7.90	8.10	8.30

TIN PLATE, Hot Dipped Common Coke	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$10.40	$10.65
Fairfield,Ala. T2	10.50	10.75
Fontana,Calif. K1	11.05	11.30
Gary,Ind. U5	10.40	10.65
Ind.Harb. Y1	10.40	10.65
Irvin,Pa. U5	10.40	10.65
Pitts.,Calif. C11	11.05	11.30
Sp.Pt.,Md. B2	10.40	10.65
Weirton,W.Va. W6	10.40	10.65
Yorkville,O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5 .....$8.20
Fairfield,Ala. T2 .....8.30
Fairless,Pa. U5 .....8.30
Fontana,Calif. K1 .....8.85
Gary,Ind. U5 .....8.20
GraniteCity,Ill. G4 .....8.30
Ind.Harbor,Ind. I-2, Y1..8.20
Irvin,Pa. U5 .....8.20
Niles,O. R2 .....8.20
Pittsburg,Calif. C11 ...8.85
SparrowsPoint,Md. B2..8.20
Weirton,W.Va. W6 .....8.20
Yorkville,O. W10 .....8.20

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5 .....7.85
Gary,Ind. U5 .....7.85
GraniteCity,Ill. G4 .....7.95
Ind.Harbor,Ind. Y1 ....7.85
Irvin,Pa. U5 .....7.85
Yorkville,O. W10 .....7.85

MANUFACTURING TERNES (Special Coated, Base Box)

Gary,Ind. U5 .....$10.05
Irvin,Pa. U5 .....10.05

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge,Pa. A4	....	....	12.40	13.55	14.65
GraniteCity,Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield,O. E6	9.875*	11.70	12.40	13.55	14.65
Newport,Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles,O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift,Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren,O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville,O. A10	....	11.70†	12.40	13.55	14.65

Vandergrift,Pa. U5	8.10
Mansfield,O. E6	8.10
Warren,O. R2 (Silicon Lowcore)	8.10

SHEETS (22 Ga., coils & cut lengths)

Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.70	16.30	16.80	17.55
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85
Zanesville,O. A10	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler,Pa. A10	....	....	....	19.70	20.20	20.70 ....
Vandergrift,Pa. U5	..	17.10	18.10	19.70	20.20	20.70 15.70
Warren,O. R2	....	....	....	....	....	.... 15.70‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ..8.00
Aliquippa,Pa. J5 .....8.00
Alton,Ill. L1 .....8.20
Atlanta A1 .....8.00
Bartonville,Ill. K4 .....8.10
Buffalo W12 .....8.00
Chicago W13 .....8.00
Cleveland A7, C20 ....8.00
Crawfordsville,Ind. M8..8.10
Donora,Pa. A7 .....8.00
Duluth A7 .....8.00
Fairfield,Ala. T2 .....8.00
Fostoria,O.(24) S1 .....8.10
Houston S5 .....8.25
Jacksonville,Fla. M8 ...8.35
Johnstown,Pa. B2 .....8.00
Joliet,Ill. A7 .....8.00
KansasCity,Mo. S5 .....8.25
Kokomo,Ind. C16 .....8.10
LosAngeles B3 .....8.95
Minnequa,Colo. C10 ....8.25
Monessen,Pa. P7, P16..8.00
Palmer,Mass. W12 ....8.30
Pittsburg,Calif. C11 ....8.95
Portsmouth,O. P12 ....8.00
Rankin,Pa. A7 .....8.00
S.Chicago,Ill. R2 .....8.00
S.SanFrancisco C10 ...8.95
SparrowsPoint,Md. B2 ..8.10
Sterling,Ill.(1) N15 ....8.00
Sterling,Ill. N15 .....8.10
Struthers,O. Y1 .....8.00
Waukegan,Ill. A7 .....8.00
Worcester,Mass. A7 ....8.30

WIRE, Cold Heading Carbon

Elyria,O. W8 .....8.00

WIRE, Gal'd., for ACSR

Bartonville,Ill. K4 ....12.65
Buffalo W12 .....13.40
Cleveland A7 .....12.65
Donora,Pa. A7 .....12.65
Duluth A7 .....12.65
Johnstown,Pa. B2 .....13.40
KansasCity,Mo. U3 ....12.90
Minnequa,Colo. C10 ..12.775
Monessen,Pa. P7, P16..12.65
Muncie,Ind. I-7 .....13.60
NewHaven,Conn. A7 ...12.95
Palmer,Mass. W12 ....13.70
Pittsburg,Calif. C11 ...13.45
Portsmouth,O. P12 ....12.65
Roebling,N.J. R5 .....12.95
SparrowsPt.,Md. B2 ....13.50
Struthers,O. Y1 .....13.40
Trenton,N.J. A7 .....12.95
Waukegan,Ill. A7 .....12.65
Worcester,Mass. A7 ...12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....9.75
Alton,Ill. L1 .....9.95
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Johnstown,Pa. B2 .....9.75
KansasCity,Mo. S5, U3.10.00
LosAngeles B3 .....10.70
Minnequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16..9.75
NewHaven,Conn. A7 ...10.05
Palmer,Mass. W12 ....10.05
Pittsburg,Calif. C11 ...10.70
Portsmouth,O. P12 .....9.75
Roebling,N.J. R5 .....10.05
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ...10.70
SparrowsPt.,Md. B2 ....9.85
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....10.05
Waukegan,Ill. A7 .....9.75
Worcester,Mass. A7,J4,T6 10.05

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1 .....16.50
Bartonville,Ill. K4 ....16.40
Chicago W13 .....16.30
Cleveland A7 .....16.30
Crawfordsville,Ind. M8.16.40
Fostoria,O. S1 .....16.30
Houston S5 .....16.55
Jacksonville,Fla. M8 ..16.45
Johnstown,Pa. B2 .....16.30
KansasCity,Mo. S5 ....16.55
Kokomo,Ind. C16 .....16.30
Minnequa,Colo. C10 ...16.55
Monessen,Pa. P16 .....16.30
Muncie,Ind. I-7 .....16.50
Palmer,Mass. W12 .....16.60
S.SanFrancisco C10 ....17.15
Waukegan,Ill. A7 .....16.30
Worcester,Mass. A7,J6.16.60

WIRE, Tire Bead

Bartonville,Ill. K4 ....17.15
Monessen,Pa. P16 .....17.15
Roebling,N.J. R5 .....17.65

ROPE WIRE (A)

Bartonville,Ill. K4 ....13.45
Buffalo W12 .....13.45
Fostoria,O. S1 .....13.45
KansasCity,Mo. U3 ....13.70
Johnstown,Pa. B2 .....13.45
Monessen,Pa. P7 .....13.45
Muncie,Ind. I-7 .....13.65
Palmer,Mass. W12 .....13.75
Portsmouth,O. P12 .....13.45
Roebling,N.J. R5 .....13.75
St.Louis L8 .....13.45
SparrowsPt.,Md. B2 ...13.55
Struthers,O. Y1 .....13.45
Worcester,Mass. J4 ....13.75
(A) Plow and Mild Plow; add 0.25c for Improved Plow.

cool · tough

DASCO SUPER SOLUBLE BASE

water-mix cutting fluid

Under adverse conditions—on jobs too difficult for regular water-mix cutting fluids, yet not suited for straight petroleum oils—Stuart's Dasco Super-Soluble Base will improve performance and profits, reduce costs.

Here is a water-mix cutting fluid with a sulfochlorinated fatty oil base that assures proper chip formation, prevents welding, and reduces heat-generating friction under extreme circumstances. It is a heavy-duty soluble oil that permits machining of stainless, low carbon steels, monel, and jet engine alloys with economical tool life and fine surface finish.

Even at slow cutting speeds, the chemically active extreme pressure additive in Dasco Super-Soluble provides antiweld protection at the tool-chip interface—prevents edge build-up and cratering of tools.

Dasco Super-Soluble gives you high lubricity, antiwear, and antiweld qualities, plus the high cooling capacity inherent in a water-mix cutting fluid. It is ideal for heavy-duty turret lathe work, high-speed turning with carbides, tough form milling, boring, and surface or round-hole broaching. Use it at 40 to 1 for turning, drilling, milling, boring, sawing, and reaming—15 to 1 for broaching.

Stuart

here comes real detergency

Stuart's new Hi-D

transparent metalworking compound

Hybrid compound keeps grinding wheels open and free-cutting, minimizes machine tool maintenance.

Now, today, there is a metalworking compound that offers extra-high detergency for stress-free grinding, yet does not attack paint, remove way lubricant, or leave crystalline deposits on the machine . . . that lubricates as it cleans, yet does not leave an oil film on the chuck . . . that is just as clear as any synthetic compound, yet is a petrochemical-type solution that is effective and stable at 60:1.

Hi-D is one of the outstanding lubrication developments in Stuart's 90-year history. Yet, it costs less per drum than most "coolants"—up to ⅓ less at proper dilution than some high-priced cutting fluids.

No other cutting and grinding compound is anything like it. Best described as a hybrid, it has all the qualities you look for in a synthetic without any of the disadvantages.

Stuart

D. A. STUART OIL CO., LIMITED
2727 South Troy Street, Chicago 23, Illinois

Canadian D. A. Stuart Oil Co., Limited, P. O. Box 430,
43 Upton Road, Scarborough, Ontario, Canada

Wire, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	12.65
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7,T6	12.65

NAILS, Stock

	Col.
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	175
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	$10.30

NAILS, Cut (100 lb kegs)

Wheeling,W.Va. W10	$10.10

POLISHED STAPLES

	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	177
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	175
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	178
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	181

TIE WIRE, Automatic Baler (14½ Ga.)(per 97 lb Net Box)
Coil No. 3150

AlabamaCity,Ala. R2	$9.24
Atlanta A11	10.36
Bartonville,Ill. K4	9.34
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	9.34
Donora,Pa. A7	9.24
Duluth A7	9.24
Fairfield,Ala. T2	9.24
Houston S5	10.51
Jacksonville,Fla. M8	9.34
Johnstown,Pa. B2	9.24
Joliet,Ill. A7	9.24
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	9.34
LosAngeles B3	9.94
Minnequa,Colo. C10	9.49
Pittsburg,Calif. C11	9.94
S.Chicago,Ill. R2	9.24
S.SanFrancisco C10	9.94
SparrowsPt.,Md. B2	9.34
Sterling Ill.(37) N15	9.34

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.54
Atlanta A11	10.70
Bartonville,Ill. K4	9.64
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.64
Donora,Pa. A7	9.54
Duluth A7	9.54
Fairfield,Ala. T2	9.54
Houston S5	10.85
Jacksonville,Fla. M8	9.64
Johnstown,Pa. B2	9.54
Joliet,Ill. A7	9.54
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	9.64
LosAngeles B3	10.26
Minnequa,Colo. C10	9.79
Pittsburg,Calif. C11	10.28
S.Chicago,Ill. R2	9.54
S.SanFrancisco C10	10.26
SparrowsPt.,Md. B2	9.64
Sterling Ill.(37) N15	9.64

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$9.59
Atlanta A11	10.75
Bartonville,Ill. K4	9.69
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.69
Donora,Pa. A7	9.59
Duluth A7	9.59
Fairfield,Ala. T2	9.59
Houston S5	10.90
Jacksonville,Fla. M8	9.69
Johnstown,Pa. B2	9.59
Joliet,Ill. A7	9.59
KansasCity,Mo. S5	10.90
Kokomo,Ind. C16	9.69
LosAngeles B3	10.37
Minnequa,Colo. C10	9.84
Pittsburg,Calif. C11	10.31
S.Chicago,Ill. R2	9.59
S.SanFrancisco C10	10.31
SparrowsPt.,Md. B2	9.69
Sterling Ill.(37) N15	9.69

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	214
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS

	Col.
Birmingham C15	177
ChicagoHts.,Ill. C2, I-2	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	193*
Aliquippa,Pa. J5	190‡
Atlanta A11	198‡
Bartonville,Ill. K4	198
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196‡
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196‡
Pittsburg Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
S.SanFrancisco C10	213*
SparrowsPoint,Md. B2	198‡
Sterling,Ill.(7) N15	198

WOVEN FENCE, 9-15 Ga. Col.

Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-11½ga.J5	190‡
Atlanta A11	192‡
Bartonville,Ill. K4	192
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(43) B2	190‡
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A7	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192

WIRE (16 gage)	**An'ld Galv. Stone**	**Stone**
Ala.City,Ala.R2	17.85	19.40**
Aliq'ppa,Pa. J5	17.85	19.65
Bartonville K4	17.95	19.80
Cleveland A7	17.85	....
Craw'dville M8	17.95	19.80‡‡
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65**
Jacksonville M8	18.95	19.80‡‡
Johnstown B2	17.85	19.65‡
Kan.City,Mo. S5	18.10	....
Kokomo C16	17.25	18.80†
Minnequa C10	18.10	19.65**
P'lm'r,Mass.W12	18.15	19.70†
Pitts.Calif. C11	18.20	19.75†
S.San.Fran. C10	18.20	19.75**
St'ling(37) N15	17.95	19.80
SparrowsPt. B2	17.95	19.75‡
Waukegan A7	17.85	19.40†
Worcester A7	18.15	....

WIRE, Merchant Quality

(6 to 8 gage)	An'd Galv.	Galv.
Ala.City,Ala. R2	9.00	9.55**
Aliquippa J5	8.65	9.325‡
Atlanta(48)A11	9.10	9.775‡
Bartonville(48) K4	9.10	9.80
Buffalo W12	9.00	9.55†
Cleveland A7	9.00	....
Crawfordsville M8	9.10	9.80††
Donora,Pa. A7	9.00	9.55†
Duluth A7	9.00	9.55†
Fairfield T2	9.00	9.55†
Houston(48) S5	9.25	9.80**
Jack'ville,Fla. M8	9.10	9.80‡‡
Johnstown(48) B2	9.00	9.675‡
Joliet,Ill. A7	9.00	9.55†
KansasCity(48)S5	9.25	9.80**
Kokomo(48) S16	910	9.65†
LosAngeles B3	9.95	10.625‡
Minnequa C10	9.25	9.80**
Monessen(48) P7	8.65	9.35‡
Palmer,Mass. W12	9.30	9.85†
Pitts.,Calif. C11	9.95	10.50†
Rankin,Pa. A7	9.00	9.55†
S.Chicago R2	9.00	9.55**
S.SanFran. C10	9.95	10.50**
Spar'wsPt.(48)B2	9.10	9.775‡
St'ling(37)(48) N15	9.10	9.80
Struthers O. Y1	9.00	9.65‡
Worcester,Mass.A7	9.30	9.85†

Based on zinc prices of: *13.50. †5s. ‡10c. ‡‡less than 10c. †††10.50c. ‡‡11.00c. **Subject to zinc equalization extras.

FASTENERS

(Consumer discounts, per cent off list prices, orders for 1 container for assorted sizes; for less than container quantities, add 25 per cent; attaching nuts to bolts, package sizes, add 7.5 per cent; heavy hex nuts 1⅛ in. through 1½ in. tapped 8 threads, add 10 per cent)

HEX HEAD CAP SCREWS, coarse or fine thread, packaged or bulk, with or without hex nuts, 1020 steel bright and high carbon heat treated, ¼ in. thru 1 in. diam., listed lengths:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
Bulk	50

BOLTS, standard stock sizes:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
*Bulk	50

*Hot galvanized or zinc plated lag bolts only—for package or bulk quantities use applicable list less bulk discounts.

HEXAGON NUTS, American Standard: Finished hex, hex jam, and hex slotted coarse or fine thread, ⅛ in. through 3 in., finished hex thick, thick and slotted, castle, fine thread, ¼ in. through 1½ in., semifinished hex heavy, heavy and jam, heavy and slotted, coarse thread, ¼ in. through 4 in., and

SQUARE NUTS American Standard: Regular square and heavy square, coarse thread, ¼ in. through 2 in.:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
Bulk	50

CAP AND SETSCREWS Filister Head, Cap Screws, Coarse Thread:

Packages	+55
Bulk	+16

Flat Head Cap Screws:

¾ in. and smaller, 6 in. and shorter:	
Packages	+85
Bulk	+38

Setscrews, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam, 6 in. and shorter:	
Packages	+ 5
Bulk	+19
Through 1 in. diam., longer than 6 in.:	
Packages	+29

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in., larger 12.85
½ in. and smaller by 6 in. and shorter: 15% off list.

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over)

	Standard Diameter, Inches				
	1/4	5/16	3/8	7/16	1/2
Alton,Ill. L1	$28.95	$43.40	$55.40	$73.00	$95.10
Buffalo W12	28.95	43.40	55.40	73.00	95.10
Cleveland A7	28.95	43.40	55.40	73.00	....
KansasCity,Mo. U3	29.85	43.00	55.40	73.00	95.10
Monessen,Pa. P16	32.15	48.20	61.55	81.10	105.65
NewHaven,Conn. A7	28.95	43.40	55.40	73.00	95.10
Pittsburg,Calif. C11	28.95	43.40	55.40	73.00	95.10
Minnequa,Colo. C10	28.95	43.40	55.40	73.00	95.10
Roebling N.J. R5	28.95	43.40	55.40	73.00	95.10
SparrowsPoint,Md. B2	28.95	43.40	55.40	73.00	95.10
St. Louis L8	28.95	43.40	55.40	73.00	95.10
Waukegan,Ill. A7	28.95	43.40	55.40	73.00	95.10

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.13
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	53.17	40.26
2¼	12	49.24	57.72	43.70
2½	12	54.23	63.57	48.13
2¾	12	58.73	68.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Tee Rails All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.60	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....(16)	6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	6.875

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh S44	15.35
Seattle B3	15.85

SCREW SPIKES

Lebanon,Pa. B2	15.10

STANDARD TRACK SPIKES

Fairfield,Ala. T2	10.10
Ind.Harbor,Ind. I-2 Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ¾" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 6.295c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.635c.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds, 9.65c, over 3½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	¼		⅜		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	1.5	+27	+10.5	+36	+21	+45.5	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+26	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.72		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on price of zinc at 13.00c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	45.00
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	49.25
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	47.50
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	52.00
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	31.25	42.00	43.75	47.00	49.50	45.75	55.00	55.00
304L	....	....	49.75	51.50	54.75	57.25	53.50	62.75	62.75
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.25	75.75	71.75	80.75	80.75
316L	....	....	72.25	76.25	79.50	83.50	79.50	88.50	88.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.00	65.50
330	....	....	123.25	....	113.00	143.75	135.00	149.25	149.25
18-8 CbTa	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	29.25	....	33.25	35.00	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	29.75	31.00	33.25	35.00	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates 5%	Plates Carbon Base 10%	Plates Carbon Base 15%	Plates Carbon Base 20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	48.90	59.55	70.15	80.55	....
Nickel	41.65	51.95	63.30	72.70	....
Nickel, Low Carbon	41.95	52.60	63.30	74.15	....
Monel	43.35	53.55	63.80	74.05	....

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	$36.80	$44.20

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	V-Cr Hot Work (H-13)	0.550
Spec. Carbon (W-1)	0.385	W-Cr Hot Work (H-12)	0.530
Oil Hardening (O-1)	0.505	W Hot Wk. (H-21)	1.425-1.44
V-Cr Hot Work (H-11)	0.505	Hi-Carbon-Cr (D-11)	0.955

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	...	T-1	1.840
18	4	2	....	...	T-2	2.005
13.5	4	3	....	...	T-3	2.105
18.25	4.25	1	4.75	...	T-4	2.545
18	4	2	9	...	T-5	2.915
20.25	4.25	1.6	12.95	...	T-6	4.330
13.75	3.75	2	5	...	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
Birmingham R2	62.00	62.50**	....	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago, Ill. R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	69.02	69.52	69.52	70.02
Muskegon, Mich., deld.	....	74.52	74.52	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	Nom.	Nom.	Nom.	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
New York, deld.	....	75.50	76.00	....
Newark, N.J., deld.	72.69	73.19	73.69	74.19
Philadelphia, deld.	70.41	70.91	71.41	71.99
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Pittsburgh District				
Neville Island, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKees Rocks, Pa., deld.	....	67.60	67.60	68.13
Lawrenceville, Homestead, Wilmerding, Monaca, Pa., deld.	....	68.26	68.26	69.79
Verona, Trafford, Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge, Pa., deld.	68.60	69.10	69.10	69.63
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....
Mansfield, Ohio, deld.	71.30	....	71.80	72.30
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Everett, Mass. E1	67.50	68.00	68.50	....
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
Granite City, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	....	62.50‡	66.50	....
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson, Ohio I-3, J1	$78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Calvert City, Ky. P15	$99.00
Niagara Falls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry, K2	89.00
Keokuk, Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles, Tenn. T3 (Phos. 0.035% max)	$73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Troy, N.Y. R2 (Phos. 0.075% max)	73.00
Swedeland, Pa. A3 (Intermediate) (Phos. 0.036-0.075% max)	73.00
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075%)	71.00
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Neville Island, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00

Steel Service Center Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Denver, Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Birmingham, Chattanooga, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Galv. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††[5]		Carbon	Floor
Atlanta	8.59‖	9.86‖	10.13	....	8.91	9.39	13.24 #	....	9.40	9.29	11.21
Baltimore	9.80[a]	10.00[b]	10.06	....	11.45[e]	10.05[d]	11.80 #	16.38	9.55	9.90[e]	10.50
Birmingham	9.43[a]	10.20[b]	....	....	10.91[e]	9.59[d]	13.14 #	16.76	9.00	9.79[e]	10.90
Boston	10.07	11.42	11.77	53.50	12.17	10.19	13.30 #	15.64	10.64	10.27	11.95
Buffalo	8.40	9.60	11.25	55.98	8.75	9.15	11.45 #	15.40	9.25	9.20	10.75
Chattanooga	8.35	9.69	9.65	....	8.40	8.77	10.46	....	8.88	8.80	10.66
Chicago	8.25	9.45	10.90	53.00	8.51	8.99	9.15	15.05	9.00	8.89	10.20
Cincinnati	8.43	9.51	10.95	53.43	8.83	9.31	11.58 #	15.37	9.56	9.27	10.53
Cleveland	8.54[a]	8.79[b]	10.94	52.33	10.32[e]	8.75[d]	11.25 #	15.16	9.39	8.71[e]	10.50[f]
Dallas	8.80	9.30	....	....	8.85	8.80	....	....	8.75	9.15	10.40
Denver	9.40	11.84	12.94	....	9.43	9.80	11.19	....	9.84	9.76	11.08
Detroit	8.51	9.71	11.25	56.50	8.88	9.30	9.51	15.33	9.56	9.26	10.46
Erie, Pa.	8.35	9.45	9.95[10]	....	8.60	9.10	11.25	....	9.35	9.10	10.60
Houston	9.65[a]	9.65[b]	....	52.00	10.85[e]	8.90[d]	13.10 #	16.55	8.35	9.65[e]	10.10
Jackson, Miss.	8.52	9.79	....	....	8.84	9.82	10.68	....	9.33	9.22	11.03
Los Angeles	8.70[2]	10.82[2]	12.20	57.60	9.15	9.10[2]	12.95[2]	16.35	9.00[2]	9.10[2]	11.30[2]
Memphis, Tenn.	8.59	9.80	....	....	8.84	9.32	11.25 #	....	9.33	9.22	10.86
Milwaukee	8.39	9.59	11.04	....	8.65	9.13	9.39	15.19	9.22	9.03	10.34
Moline, Ill.	8.55	9.80	....	....	8.84	8.95	9.15	....	8.99	8.91	....
New York	9.17	10.49	11.35	53.08	9.64	9.99	13.25 #	15.50	9.74	9.77	11.05
Norfolk, Va.	8.65	....	....	....	9.15	9.30	12.75	....	9.65	9.10	10.50
Philadelphia	8.20	9.55	10.89	52.17	9.25	9.40	11.95 #	15.48	9.10	9.15	10.40**
Pittsburgh	8.54[a]	8.79[b]	10.76	52.33	10.30[e]	8.64[d]	11.25 #	15.05	9.00	8.47[e]	10.28[f]
Richmond, Va.	8.65	....	10.79	....	9.15	9.55	....	....	9.65	9.10	10.60
St. Louis	8.72	9.83	11.28	....	10.38	8.81	9.78	15.43	9.48	8.64	10.43
St. Paul	8.80[a]	9.31[b]	10.54	....	10.32[e]	8.70[d]	11.49 #	16.54	9.38	8.60[e]	10.49
San Francisco	9.65	11.10	11.55	55.10	9.75	10.15	13.60	16.25	9.85	10.00	12.35
Seattle	10.30	11.55	12.50	56.52	10.25	10.50	14.70	16.80[2]	10.20	10.10	12.50
South'ton, Conn.	9.07	10.33	10.71	....	9.48	9.74	....	....	9.57	9.57	10.91
Spokane	10.30	11.55	12.50	57.38	10.75	11.00	14.70	16.80	10.20	10.10	13.00
Washington	9.15	....	....	....	9.65	10.05	12.50	....	10.15	9.60	11.10

*Prices do not include gage extras; †prices include gage and coating extras; ‡includes 35-cent bar quality extras; ‖42 in. and under; **¼ in. and heavier; ††as annealed; ‡‡¾ in. to 4 in. wide, inclusive; #net price, 1 in. round C-1018.

[a]10 Ga.; [b]20 Ga.; [e]¼ x 1 in.; [d]¾-2½ in.; [e]¼ x 84 in.; [f]¼ x 36 in.

Base quantities, 2000 to 4999 lb except as noted; cold-finished bars, 2000 lb and over except in Seattle, 2000 to 3999 lb; stainless sheets, 8000 lb except in Chicago, New York, Boston, Seattle, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb, except in Seattle, 30,000 lb and over; [2]—30,000 lb; [5]—1000 to 4999 lb; [6]—1000 to 1999 lb; [10]—2000 lb and over.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchens, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., $140; Salina, Pa., $145; Niles, Ohio, $138; Cutler, Utah, $175.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $248.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $158; Morrisville, Hays, Latrobe, Pa., $163; E. Chicago, Ind., St. Louis, $168; Canon City, Colo., $183; Curtner, Calif., $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $140; Philadelphia, Clearfield, Pa., $145.

Ladle Brick (per 1000 pieces*)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa., Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Danville, Ill., $253; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.60.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜ in. grains with fines: Baltimore, $73.

*—9 in. x 4½ x 2.50 straights.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid $26.50-$27; barge, Brownsville, Tex., $29-$29.50.

Ores

Lake Superior Iron Ore

(Prices effective at start of the 1959 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1959, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, concentrates	nom.

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	21.00†
Brazilian iron ore, 68.5%	21.00

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$17.50-18.00*
Domestic, concentrates, f.o.b. milling points	22.00-23.00

*Before duty. †Nominal.

Manganese Ore

Mn 46-48%, Indian 48-50c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$34.00-35.00†
48% no ratio	25.00-26.00†

South African Transvaal

44% no ratio	18.00†
48% no ratio	24.00-26.00†

Turkish

48% 3:1	36.00-37.00†

Domestic

Rail nearest seller

48% 3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

50-55%	$2.50-2.75
60-65%	2.80-3.20

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

†Nominal.

Canadian Steel

(Cents per pound, f.o.b. mill, except as otherwise noted)

Billets, Blooms & Slabs:	
Carbon, Forging Quality (net ton)	$97.00
Alloy (net ton)	115.00
Wire Rods:	
Carbon, ⅜" to under ¼ in.	5.30
Carbon, ¼ in. to 47/64 in.	5.70
Alloy	6.40
Wire (carload lots)	8.40
Bars & Small Shapes:	
Carbon, merchant quality	5.40
Carbon, special quality	5.85
Alloy	6.40
Bar Mill Bands:	
Carbon	5.40
Alloy	8.05
Structural Size Angles & Zees	5.40
Plates:	
Carbon	5.45
Sheets & Coils, Hot Rolled:	
Carbon Sheets	5.00
Carbon Strip	5.00
Sheets & Coils, Cold Rolled:	
Carbon Sheets	6.35
Carbon Strip (0.080 and lighter)	6.35
Carbon Strip (0.081 and heavier)	6.65
Sheets & Coils, Galvanized:	
Standard Quality	6.70
Culvert Quality	7.00
Sheets, Porcelain Enameling	7.45
Sheets & Coils, Electrical:	
Field Grade	9.00
Armature Grade	9.50
Electrical Grade	10.15
Tin Mill Products (Per Base Box; 100 lb basis wt)	
Coke Tin Plate (1.25 lb pot yield)	$10.60
Electrolytic Tin Plate (0.25 lb coating)	9.10
Black Plate	8.30
Nails, c.l. lots, 400 keg min. (per keg)	$8.15

Metal Powder

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. trucklots, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails	9.85§
40 mesh, bags	8.10††
Electrolytic Iron, Melting stock, 99.87% Fe, irreg. fragments, ⅛ in. x 1.3 in.	28.75
(In contract lots of 240 tons price is 22.75c)	
Annealed, 99.5% Fe	36.75
Unannealed (99+% Fe)	33.25
Unannealed (99+% Fe) (minus 325 mesh)	58.25
Powder Flake (minus 16 plus 100 mesh)	29.25
Carbonyl Iron: 98.1-98.9%, 3 to 20 microns, depending on grade, 93.00-290.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 500-lb drum freight allowed, c.l. 38.50; ton lots 40.50	
Antimony, 500-lb lots	42.00*
Brass, 500-lb lots	35.60-52.90†
Bronze, 5000-lb lots	54.00-57.60†.
Copper, electrolytic	14.25*
Copper, reduced	14.25*
Lead	7.50*
Manganese, Electrolytic: Minus 35 mesh	$1.00
Nickel	$1.15
Nickel-Silver, 5000-lb lots	60.90-69.70†
Phosphor-Copper, 5000-lb lots	67.00
Copper (atomized) 5000-lb lots	47.50-65.50
Solder	7.00*
Silicon	70.00*
Stainless Steel, 304	89.00*
Stainless Steel, 316	$1.07
Tin	14.00*
Zinc, 5000-lb lots	21.20-34.40‡
Tungsten: Carbon reduced, 98.8% min., minus 65 mesh	Dollars nom**
Chromium electrolytic 99.8% Cr, min., metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §Cutting and scarfing grade. **Depending on price of ore. ††Welding grade.

Metallurgical Coke

Price per net ton

Beehive Coke	
Connellsville, Pa., furnace	$14.75-15.25
Connellsville, Pa., foundry	18.00-18.50
Oven Foundry Coke	
Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Detroit, ovens	32.00
Pontiac, Mich., deld.	33.95
Saginaw, Mich., deld.	35.53
Erie, Pa., ovens	32.00
Everett, Mass., ovens: New England, deld.	33.55*
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.54
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.19
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.68
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

*Within $5.15 freight zone from works.

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$6.59	$6.64	$6.49	$6.34	$6.74
Bar Size Angles	6.25	6.30	6.15	6.05	6.40
Structural Angles	6.16	6.21	6.06	5.96	6.31
I-Beams	6.16	6.21	6.06	5.96	6.31
Channels	6.16	6.21	6.06	5.96	6.31
Plates (basic bessemer)	6.28	6.33	6.18	6.08	6.43
Sheets, H.R.	7.50	7.55	7.40	7.30	7.65
Sheets, Galvanized, 20 Ga., 36 in. x 96 in.	9.70	9.75	9.60	9.50	9.85
Sheets, Galv. (in coils) 20 Ga., 48 in. wide	9.80	9.85	9.70	9.60	9.95
Sheets, C.R. (drawing quality)	10.70	10.75	10.60	10.50	10.85
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	25.08	24.20	24.42	24.15	25.47
Barbed Wire (†)	6.80	6.85	6.70	6.60	6.95
Merchant Bars	6.69	6.74	6.59	6.49	6.84
Hot-Rolled Bands	7.90	7.95	7.80	7.70	8.05
Wire Rods, Thomas Commercial No. 5	6.60	....	6.45	6.45	6.70
Wire Rods, O. H.	7.05	....	6.90	6.90	7.15
Bright Common Wire Nails (‡)	8.15	8.20	8.05	7.95	8.30

†Per 82 lb net reel. ‡Per 100-lb keg, 20d nails and heavier.

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.	
Pure benzene	34.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg.	5.00
Toluene, one deg. (deld. east of Rockies)	25.00
Cents per lb, f.o.b. tank cars or tank trucks, deld.	
Phenol, 90 per cent grade	14.75
Per net ton bulk, f.o.b. cars or trucks, plant	
Ammonium sulfate, regular grade	$32.00

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, 10 lb pigs, per gross ton, Palmerton, Neville Island, Pa. 21-23% Mn, $102.50, 19-21% Mn, 1-3% Si, $100; 16-19% Mn, $98. Lump, 35 lb and down: Deduct $2 from 10 lb pig prices.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net tons, $220, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Mn 79-81%). Lump $253 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 4c for max 0.15% C grade from above prices, 5.3c for max 0.03% C, 6.6c for max 0.5% C, and 8.1c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 24c per lb of contained Mn; packed, carload 25.3c, ton lot 26.9c, less ton 28.1c.

Electrolytic Manganese Metal: Min carload, bulk, 34.25c; 2000 lb to min carload 37c; less ton, 39c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: Mn 65-68%). Carload, lump, bulk, 1.50% C grade, 18.5-21% Si, 11.6c per lb of alloy. Packed, c.l. 12.8c, ton 13.25c, less ton 14.25c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.3c from above prices. For 3% grade, Si 12.5-16%, deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb, $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $250 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $255.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $300 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $305.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk, 28.75c per lb of contained Cr. Delivered.

Charge Chrome: No. 1 (Cr 61-65%, C 5-7%, Si 5-8%), 22.00c.

Blocking Chrome: No. 1 (Cr 61-65%, C 5-7%, Si 5-8%), 22.00c; No. 2 (Cr 58-63%, C 5-6%, Si 8-10%), 23.00c; No. 3 (Cr 58-63%, C 5-6%, Si 10-12%), 23.00c.

Refined Charge Chrome: No. 1 (Cr 50-55%, C 5% max, Si 2% max), 25.00c; No. 2 (Cr 56-60%, C 5% max, Si 2% max), 25.00c.

Low-Carbon Ferrochrome: Cr 63-66% (Simplex), carload, lump, bulk, C 0.025% max, 35.75c per lb contained Cr; 0.010% max, 36.75c. Delivered.
Cr 67-71%, carload, lump, bulk, 0.025% max, 39.75c; 0.05% max, 39.00c; 0.10% max, 38.50c; 0.20% max, 38.25c; 0.50% max, 38.00c; 1.0% max, 37.75c; 1.5% max, 37.50c; 2.0% max, 37.25c. Delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). C.l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). SM x D, carload, bulk, 20.05c per lb of alloy, carload packed, 21.25c, ton lot 22.50c, less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max, 26.25c per lb contained Cr and 14.60c per lb contained Si; Cr 33-36%, Si 45-48%, C 0.05% max, 28.25c per lb contained Cr, 14.60c per lb contained Si; 0.75 in. x down, 29.40c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (C 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed, 2" x D plate (about ⅛" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1 $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 14.6c per lb contained Si. Packed, c.l. 17.1c, ton lot 18.55c, less ton 20.20c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Keokuk, Iowa; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c, ton lot 20.45c, less ton 21.7c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.07% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lot, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l., lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lots 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload, bulk 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3⅝ lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 13.7c per lb of briquet; c.l., packed, bags 14.9c; 3000 lb to c.l., pallets 14.9c; 2000 lb to c.l., bags 16.1c; less ton 17c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). C.l. bulk 14c per lb of briquet; c.l. packed, bags 15.2c; 3000 lb to c.l., pallets 15.2c; 2000 lb to c.l., bags 16.4c; less ton 17.3c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload, bulk 8c per lb of briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l., bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.49 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb f.o.b. Niagara Falls, N. Y.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $2.15 per lb (nominal) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.1% max). Ton lots 2" x D, $3.45 per lb of contained Cb; less ton lots $3.50 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 40% approx, Ta 20% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.05 per lb of contained Cb plus Ta, delivered; less ton lots $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carlot bulk 19.25c per lb of alloy, c.l. packed ½ in. x 12 M 20.00c, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%), C.l. packed, 20c per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

V-S Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk 19.25c. Packed c.l. 20.25c, 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (55-75%). Per lb of contained Mo in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.76 in all sizes except powdered which is $1.82.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans, $1.47; in bags, $1.46, f.o.b. Langeloth and Washington, Pa.

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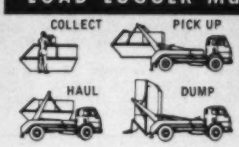

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Scrap Price Slips in Dull Market

STEEL's composite on No. 1 heavy melting grade declines for the first time since mid-December. Index now stands at $42, down 33 cents from the preceding week

Scrap Prices, Page 128

• **Chicago**—Brokers' bids on No. 1 factory bundles to be produced by auto body plants this month averaged around $45.75 delivered, maintaining the current quotation of $45-$46. It's estimated about 35,000 tons will be produced, largest monthly volume in some time. Industrial No. 1 heavy melting has sold for $1 less than the $44 recently prevailing, and the same markdown is reported on No. 1 railroad heavy melting.

• **Pittsburgh** — Brokers bid $49.35 to $50.40 for factory bundles from the local plant of GM's Fisher Body Div. The tonnage sold was somewhat larger than last month's (7300 vs. 6800) and prices averaged about $1 a ton higher. Scrap collections are slow, and the market remains dull.

• **Philadelphia**—Except for No. 1 heavy melting and No. 2 heavy melting, prices are off $1 a ton on most open hearth and electric furnace grades of scrap. Orders are light.

• **New York**—Demand is moderate, with export buying providing some support to the heavier steel grades. Brokers' buying prices on the open hearth grades are unchanged, but are off $1 on machine shop turnings, mixed borings and turnings, short shoveling turnings, and No. 1 cupola cast.

• **Cleveland**—The market here and in the Valley is lifeless. The big district steelmakers are not buying, and supplies are increasing. All signs point to lower prices over the next couple of weeks; currently quoted levels are largely nominal. Prices on the monthend auto lists were unchanged from bids in January. In the Valley, a recent sale of industrial bundles was made at $49.

• **Detroit**—Action in the blast furnace grades of scrap indicates there will be little activity in the open hearth grades of dealer material as the mills boost pig iron output for their own consumption. Prices are slightly lower on No. 2 bundles, causing other grades to weaken.

• **Buffalo**—The first representative mill purchase of No. 1 heavy melting steel here in several months was made last week. The mill paid

(*Please turn to Page* 133)

MILLS FOR SALE

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Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, Feb. 3, 1960. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Feb. 3	$42.00
Jan. 27	42.33
Jan. Avg.	41.92
Feb. 1959	42.58
Feb. 1955	36.79

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	42.00-43.00
No. 2 heavy melting	36.00-37.00
No. 1 dealer bundles	44.00-45.00
No. 2 bundles	31.00-32.00
No. 1 busheling	42.00-43.00
No. 1 factory bundles	*52.00-53.00*
Machine shop turnings	23.00-24.00
Mixed borings, turnings	23.00-24.00
Shovel turnings	30.00-31.00
Cast iron borings	30.00-31.00
Cut structurals:	
2 ft and under	50.00-51.00
3 ft and under	49.00-50.00
Heavy turnings	35.00-36.00
Punchings & plate scrap	54.00-55.00
Electric furnace bundles	52.00-53.00

Cast Iron Grades

No. 1 cupola	50.00-51.00
Stove plate	46.00-47.00
Unstripped motor blocks	32.00-33.00
Clean auto cast	47.00-48.00
Drop broken machinery	56.00-57.00

Railroad Scrap

No. 1 R.R. heavy melt.	51.00-52.00
Rails, 2 ft and under	64.00-65.00
Rails, 18 in. and under	65.00-66.00
Random rails	61.00-62.00
Angles, splice bars	59.00-60.00
Railroad specialties	59.00-60.00
Rails, rerolling	66.00-67.00

Stainless Steel Scrap

18-8 bundles & solids	230.00-235.00
18-8 turnings	120.00-125.00
430 bundles & solids	125.00-130.00
430 turnings	55.00-65.00

CHICAGO

No. 1 hvy melt., indus.	*42.00-43.00*
No. 1 hvy melt., dealer	*40.00-41.00*
No. 2 hvy melting	36.00-37.00
No. 1 factory bundles	45.00-46.00
No. 1 dealer bundles	41.00-42.00
No. 2 bundles	26.00-27.00
No. 1 busheling, indus.	*42.00-43.00*
No. 1 busheling, dealer	*40.00-41.00*
Machine shop turnings	23.00-24.00
Mixed borings, turnings	25.00-26.00
Shovel turnings	25.00-26.00
Cast iron borings	25.00-26.00
Cut structurals, 3 ft	49.00-50.00
Punchings & plate scrap	*50.00-51.00*

Cast Iron Grades

No. 1 cupola	55.00-56.00
Stove plate	50.00-51.00
Unstripped motor blocks	47.00-48.00
Clean auto cast	61.00-62.00
Drop broken machinery	61.00-62.00

Railroad Scrap

No. 1 R.R. heavy melt.	*44.00-45.00*
R.R. malleable	63.00-64.00
Rails, 2 ft and under	61.00-62.00
Rails, 18 in. and under	62.00-63.00
Angles, splice bars	55.00-56.00
Axles	59.00-60.00
Rails, rerolling	63.00-64.00

Stainless Steel Scrap

18-8 bundles, solids	220.00-225.00
18-8 turnings	115.00-120.00
430 bundles & solids	115.00-120.00
430 turnings	55.00-60.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*37.00-38.00*
No. 2 heavy melting	*23.50-24.50*
No. 1 bundles	*39.00-40.00*
No. 2 bundles	*21.00-22.00*
No. 1 busheling	*36.00-37.00*
Machine shop turnings	*13.50-14.50*
Mixed borings, turnings	*13.50-14.50*
Shovel turnings	*14.50-15.50*

Cast Iron Grades

No. 1 cupola	*44.00-45.00*
Stove plate	*38.00-39.00*
Heavy breakable	*38.00-39.00*
Unstripped motor blocks	*30.00-31.00*
Charging box cast	*38.00-39.00*
Clean auto cast	*51.00-52.00*

CLEVELAND

No. 1 heavy melting	43.00-44.00
No. 2 heavy melting	33.00-34.00
No. 1 factory bundles	47.50-48.50
No. 1 bundles	43.00-44.00
No. 2 bundles	26.00-27.00
No. 1 busheling	44.50-45.50
Machine shop turnings	16.00-17.00
Shovel turnings	22.00-23.00
Mixed borings, turnings	22.00-23.00
Cast iron borings	22.00-23.00
Cut foundry steel	43.00-44.00
Cut structurals, plate 2 ft and under	50.00-51.00
Low phos. punchings & plate	45.00-46.00
Alloy free, short shovel turnings	23.00-24.00
Electric furnace bundles	46.00-47.00

Cast Iron Grades

No. 1 cupola	55.00-56.00
Charging box cast	43.00-44.00
Heavy breakable cast	41.00-42.00
Stove plate	49.00-50.00
Unstripped motor blocks	39.00-40.00
Brake shoes	39.00-40.00
Clean auto cast	56.00-57.00
Burnt cast	47.00-48.00
Drop broken machinery	56.00-57.00

Railroad Scrap

R.R. malleable	64.00-65.00
Rails, 2 ft and under	65.00-66.00
Rails, 18 in. and under	66.00-67.00
Rails, random lengths	59.00-60.00
Cast steel	53.00-54.00
No. 1 railroad cast	58.50-59.50
Railroad specialties	57.00-58.00
Angles, splice bars	57.00-58.00
Rails, rerolling	74.00-75.00

Stainless Steel (Brokers' buying prices: f.o.b. shipping point)

18-8 bundles, solids	210.00-215.00
18-8 turnings	110.00-115.00
430 clips, bundles, solids	115.00-120.00
430 turnings	45.00-55.00

YOUNGSTOWN

No. 1 heavy melting	47.00-48.00
No. 2 heavy melting	36.00-37.00
No. 1 busheling	47.00-48.00
No. 1 bundles	48.00-49.00
No. 2 bundles	29.00-30.00
Machine shop turnings	18.00-19.00
Shovel turnings	23.00-24.00
Cast iron borings	23.00-24.00
Low phos.	48.00-49.00
Electric furnace bundles	48.00-49.00

Railroad Scrap

No. 1 R.R. heavy melt.	47.00-48.00

BUFFALO

No. 1 heavy melting	*36.00-37.00*
No. 2 heavy melting	33.00-34.00
No. 1 bundles	*36.00-37.00*
No. 2 bundles	27.00-28.00
No. 1 busheling	*36.00-37.00*
Shovel turnings	24.00-25.00
Machine shop turnings	20.00-21.00
Cast iron borings	22.00-23.00
Low phos. structurals and plate, 2 ft and under	45.00-46.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	47.00-48.00
No. 1 machinery	49.00-50.00

Railroad Scrap

Rails, random lengths	47.00-48.00
Rails, 3 ft and under	53.00-54.00
Railroad specialties	45.00-46.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*38.00-39.00*
No. 2 heavy melting	*31.50-32.50*
No. 1 bundles	*38.00-39.00*
No. 2 bundles	*27.00-28.00*
No. 1 busheling	*38.00-39.00*
Machine shop turnings	21.00-22.00
Mixed borings, turnings	21.00-22.00
Shovel turnings	23.00-24.00
Cast iron borings	21.00-22.00
Low phos. 18 in.	49.00-50.00

Cast Iron Grades

No. 1 cupola	*48.00-49.00*
Heavy breakable cast	*41.00-42.00*
Charging box cast	*41.00-42.00*
Drop broken machinery	*57.00-58.00*

Railroad Scrap

No. 1 R.R. heavy melt.	43.00-44.00
Rails, 18 in. and under	61.00-62.00
Rails, random lengths	53.00-54.00

PHILADELPHIA

No. 1 heavy melting	42.00
No. 2 heavy melting	37.00-38.00
No. 1 bundles	*46.00*
No. 2 bundles	*25.00*
No. 1 busheling	*46.00*
Electric furnace bundles	*48.00*
Mixed borings, turnings	23.00†
Shovel turnings	26.00-27.00
Machine shop turnings	23.00
Heavy turnings	31.00-35.00
Structurals & plates	*47.00-49.00*
Couplers, springs, wheels	51.00
Rail crops, 2 ft & under	66.00-68.00

Cast Iron Grades

No. 1 cupola	*42.00*
Heavy breakable cast	47.00
Drop broken machinery	54.00-55.00
Malleable	*67.00†*

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	36.00-37.00
No. 2 heavy melting	32.00-33.00
No. 1 bundles	36.00-37.00
No. 2 bundles	20.00-21.00
Machine shop turnings	*10.00-12.00*
Mixed borings, turnings	*13.00-14.00*
Shovel turnings	*14.00-15.00*
Low phos. structurals & plates	39.00-40.00

Cast Iron Grades

No. 1 cupola	*37.00-38.00*
Unstripped motor blocks	25.00-26.00
Heavy breakable	37.00-38.00

Stainless Steel

18-8 sheets, clips, solids	200.00-205.00
18-8 borings, turnings	90.00-95.00
410 sheets, clips, solids	55.00-60.00
430 sheets, clips, solids	85.00-90.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	37.00
No. 2 heavy melting	25.50-26.50
No. 1 bundles	*35.00-36.00*
No. 1 busheling	*35.00-36.00*
Machine shop turnings	12.00-13.00
Shovel turnings	16.00-17.00
No. 1 cast	39.00-40.00
Mixed cupola cast	36.00-36.50
No. 1 machinery cast	40.00-42.00

BIRMINGHAM

No. 1 heavy melting	37.00-38.00
No. 2 heavy melting	31.00-32.00
No. 1 bundles	36.00-37.00
No. 2 bundles	25.00-26.00
No. 1 busheling	*41.00-42.00*
Cast iron borings	14.00-15.00
Machine shop turnings	24.00-25.00
Shovel turnings	25.00-26.00
Bar crops and plate	44.00-45.00
Structurals & plate	44.00-45.00
Electric furnace bundles	*41.00-42.00*
Electric furnace:	
3 ft and under	*40.00-41.00*
2 ft and under	*39.00-40.00*

Cast Iron Grades

No. 1 cupola	53.00-54.00
Stove plate	53.00-54.00
Charging box cast	29.00-30.00
Unstripped motor blocks	42.00-43.00
No. 1 wheels	45.00-46.00

Railroad Scrap

No. 1 R.R. heavy melt.	39.00-40.00
Rails, 18 in. and under	57.00-58.00
Rails, rerolling	61.00-62.00
Rails, random lengths	53.00-54.00
Angles, splice bars	49.00-50.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	*36.00*
No. 2 heavy melting	*34.00*
No. 1 bundles	42.00
No. 2 bundles	26.00
No. 1 busheling	42.00
Machine shop turnings	*20.00*
Shovel turnings	*22.00*

Cast Iron Grades

No. 1 cupola	53.00
Charging box cast	46.00
Heavy breakable cast	44.00
Unstripped motor blocks	45.00
Clean auto cast	56.00
Stove plate	46.00

Railroad Scrap

No. 1 R.R. heavy melt.	44.00
Rails, 18 in. and under	54.00
Rails, random lengths	50.00
Rails, rerolling	61.00
Angles, splice bars	50.00

HOUSTON

(Brokers' buying prices; f.o.b. cars)

No. 1 heavy melting	39.00
No. 2 heavy melting	36.00
No. 1 bundles	39.00
No. 2 bundles	25.00
Machine shop turnings	19.00-20.00
Shovel turnings	23.00
Low phos. plate & structurals	46.00-47.00†

Cast Iron Grades

No. 1 cupola	45.00-46.00†
Heavy breakable	33.00
Foundry malleable	41.00-42.00
Unstripped motor blocks	36.50-37.50

Railroad Scrap

No. 1 R.R. heavy melt.	39.00

LOS ANGELES

(Brokers' buying prices)

No. 1 heavy melting	40.00
No. 2 heavy melting	*35.00-36.00*
No. 1 bundles	37.00
No. 2 bundles	*20.00*
Machine shop turnings	18.00
Shovel turnings	18.00
Cast iron borings	18.00
Cut structurals and plate 1 ft and under	48.00

Cast Iron Grades

No. 1 cupola	47.00

Railroad Scrap

No. 1 R. R. heavy melt.	39.00

PORTLAND, OREG.

No. 1 heavy melting	*37.00*
No. 2 heavy melting	*34.00*
No. 1 bundles	*34.00*
No. 2 bundles	*23.00*
Shovel turnings	22.00
Electric furnace bundles	44.00-45.00

Cast Iron Grades

No. 1 cupola	40.00-42.00
Heavy breakable	35.00
Unstripped motor blocks	31.00
Stove plate	25.00

SEATTLE

(Prepared, f.o.b. car)

No. 1 heavy melting	*36.00*
No. 2 heavy melting	*34.00*
No. 1 bundles	*34.00*
No. 2 bundles	*20.00-22.00*
Machinee shop turnings	17.00†
Mixed borings, turnings	17.00†
Electric furnace No. 1	*45.00*

Cast Iron Grades

No. 1 cupola	*35.00*
Heavy breakable cast	*30.00*
Unstripped motor blocks	*25.00*
Stove plate (f.o.b. plant)	21.00†

SAN FRANCISCO

No. 1 heavy melting	40.00
No. 2 heavy melting	36.00
No. 1 bundles	36.00
No. 2 bundles	22.00
Machine shop turnings	16.00
Mixed borings, turnings	16.00
Cast iron borings	16.00
Heavy turnings	16.00
Shovel turnings	16.00
Cut structurals, 3 ft	44.00

Cast Iron Grades

No. 1 cupola	*46.00*
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	40.00
No. 1 wheels	34.00

HAMILTON, ONT.

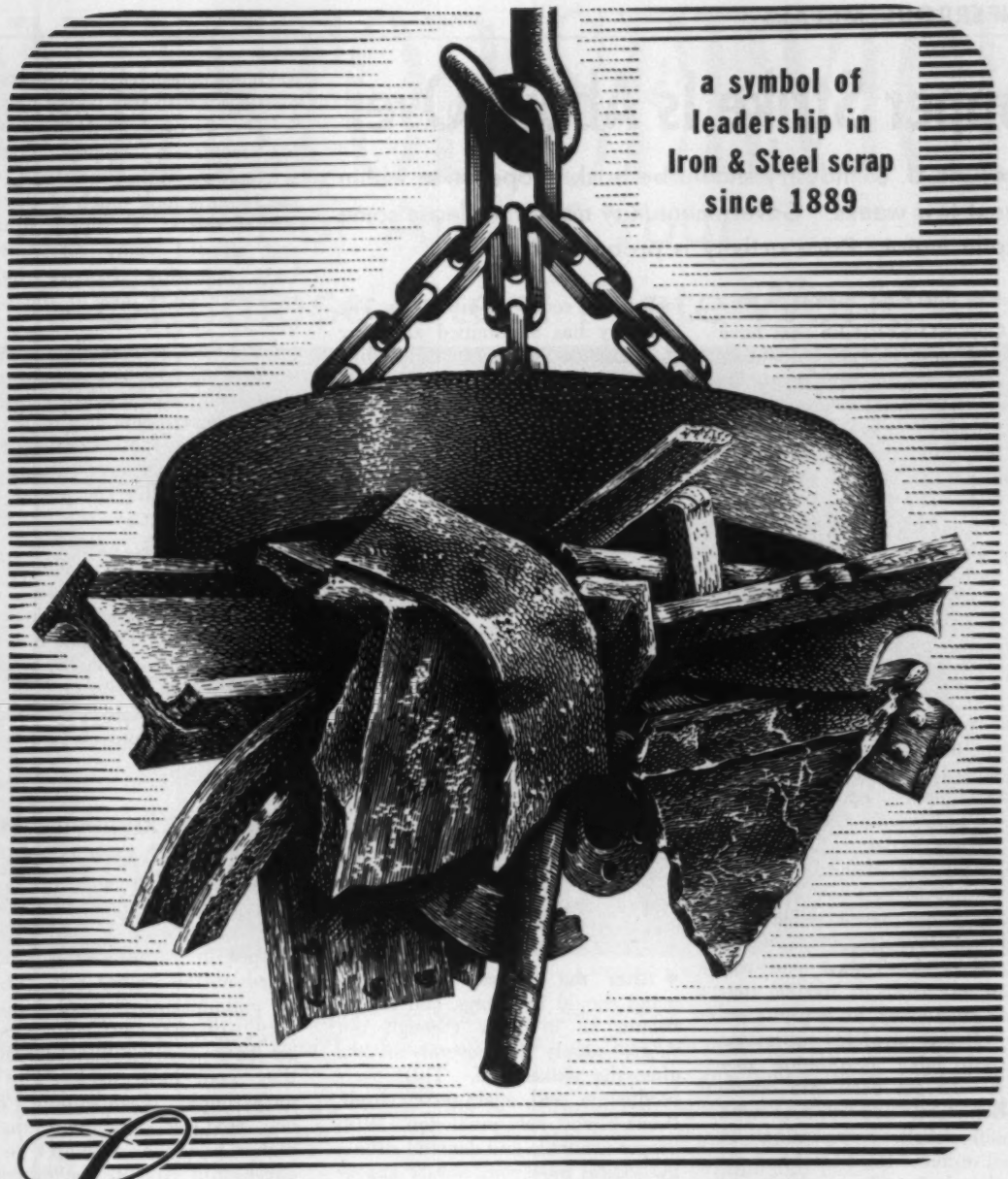
(Brokers' buying prices)

No. 1 heavy melting	32.25
No. 2 heavy melting	28.25
No. 1 bundles	32.25
No. 2 bundles	24.00
Mixed steel scrap	24.25
Mixed borings, turnings	13.00
Busheling, new factory:	13.00
Prepared	32.25
Unprepared	26.25
Shovel turnings	17.00

Cast Iron Grades†

No. 1 machinery cast	46.50-48.00

*Delivered to docks.
†Nominal.
‡F.o.b. Hamilton, Ont.



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Copper Strike Is About Over

Bulk of the U. S. industry should be back in operation within the next few weeks. Government may move to release some stockpile metal. Price activity is probable

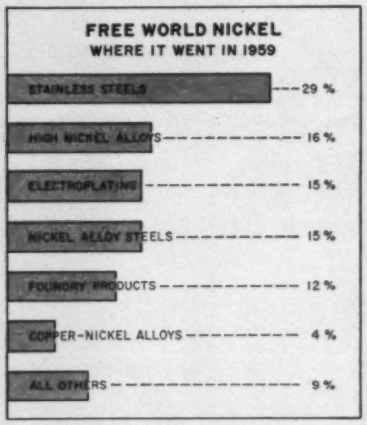
Nonferrous Metal Prices, Pages 132 & 133

PROLONGED STRIKES that have plagued domestic copper producers since early August appear to be entering their final phase. With the Kennecott operations finally back in production, hopes have blossomed that the other two members of the U. S. copper triumvirate, Anaconda and Phelps Dodge, will be able to pen an early agreement with the union.

Kennecott's settlement came when three holdout locals finally accepted the 22.3 cent an hour economic package and agreed to write into the contract a modified "no strike" clause. (The unions agree not to strike, but they won't be penalized for refusing to cross a picket line set up by another union.) This marks the first time every Kennecott local has agreed to the "no strike" clause.

• **Better System Needed**—The protracted Kennecott shutdown, which lasted 24 weeks 3 days and cost the company close to 200,000 tons of mine production, is a prime example of the unwieldy operation of current labor negotiation machinery. To get back into operation, Kennecott had to deal with some 20 locals representing 11 national unions. Each local had pet issues that had to be resolved, and some balked at parts of the contract already accepted by others. Result: It took two months from the time Kennecott signed with the United Steelworkers to achieve full labor peace.

• **Other Settlements Near?** — A settlement between Phelps Dodge and Mine-Mill may be near. The economic package shouldn't cause trouble, and reports indicate the union will withdraw its objections to a "no strike" clause—the big stumbling block to date. Negotiations between Anaconda and the Mine-Mill union still appear deadlocked over economic provisions. The company has maintained all along that because of its higher production costs it can't afford the type of contract other producers have signed. At present, about 75 per cent of Anaconda's mine production is idle.



Source: International Nickel Co. of Canada Ltd.

• **After the Strikes, What?**—Demand should be strong, and copper should be in tight (though not short) supply for several months after the strikes end. Then overproduction will again assert itself. Prices almost defy prediction. With copper available and demand strong, the logical movement would appear to be up. But a weakness in foreign quotations might force domestic prices to stay where they are. Softness in overseas demand was a big factor in keeping domestic prices down during the strike. Copper imports took much of the sting out of the U. S. supply situation and allowed many companies to keep operating (copper imports totaled 103,000 tons in the fourth quarter alone).

Later in the year there may be some price weakness.

At the strike's conclusion, look for the government to take a long, hard look at the possibility of releasing some of the 136,000 tons of copper in the Defense Production Act inventory.

Reasoning: It would tide over some users while pipelines were being filled and at the same time partially satisfy government objectives of reducing stockpile materials. But such a move probably wouldn't be made without the sanction of a bloc of mine state senators even though their approval isn't legally needed.

Dual Zinc Premiums End

You'll pay 0.25 cent a pound more for special high grade and high grade zinc purchased for delivery after Apr. 1, but anything shipped in the interim will not be billed at the higher rate, contrary to announcements made in January. In fact, most customers will get back any additional premiums they may have paid. The reason's simple: Competition! When one producer announced that its higher premiums wouldn't go into effect until Apr. 1, the others felt they had to follow suit.

NONFERROUS PRICE RECORD

	Feb. 3 Price	Last Change	Previous Price	Jan. Avg	Dec. Avg	Feb., 1959 Avg
Aluminum	26.00	Dec. 17, 1959	24.70	26.000	25.300	24.700
Copper	33.00-35.00	Dec. 23, 1959	33.00	34.000	33.269	30.159
Lead	11.80	Dec. 21, 1959	12.30	11.800	12.338	11.368
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	74.000
Tin	100.50	Feb. 1, 1960	100.375	99.875	99.130	102.364
Zinc	13.00	Jan. 8, 1960	12.50	12.917	12.500	11.409

Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary pig, 99.5+ %, f.o.b. customer custody; MAGNESIUM, pig 99.8%, Velasco, Tex.

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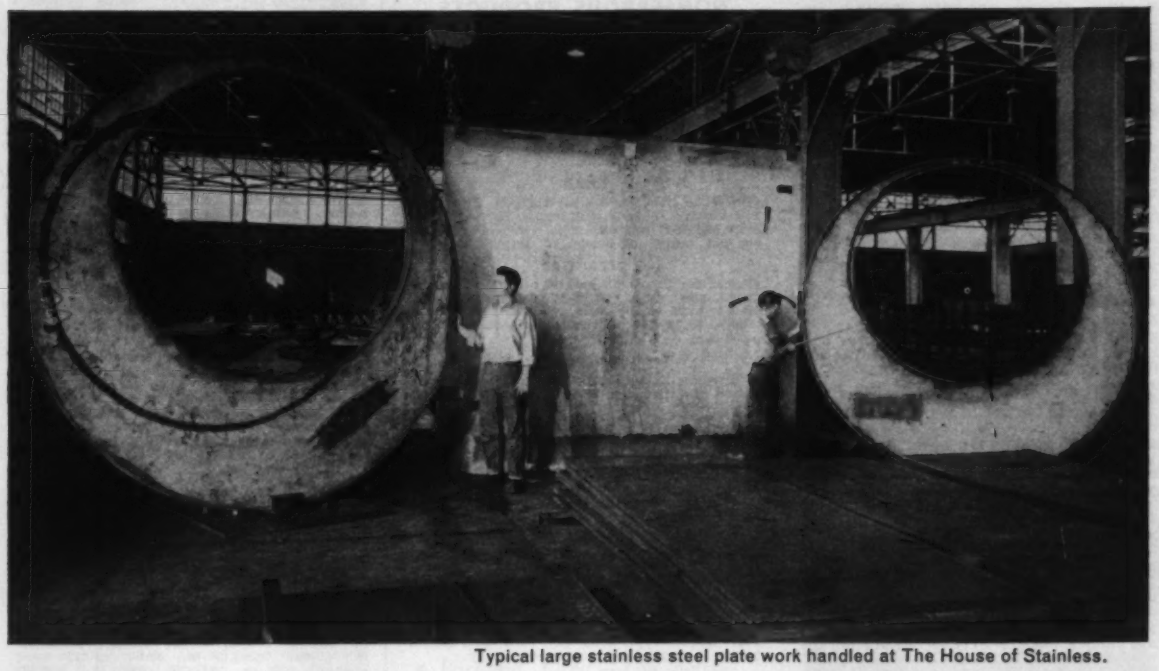

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Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 26.00; ingots, 28.10, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 29.90; No. 43, 29.70; No. 195, 30.70; No. 214, 31.50; No. 356, 28.60, 30 lb ingots; 10 lb ingots, add 0.4 cent per lb; 6 lb ingots, add 0.6 cent per lb.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 25.00-26.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.50 per lb deld.

Cobalt: 99+%, $1.75 per lb for 500-lb keg, $1.77 per lb for 100 lb case; $1.82 per lb under 100 lb.

Columbium: Powder, $55-85 per lb nom.

Copper: Electrolytic, 33.00 deld.; custom smelters, 35.00; lake, 33.00 deld.; fire refined, 32.75 deld.

Germanium: First reduction, ingots, less than 1 kg, 36.00-37.50 per gram; 1-10 kg, 30.50-32.00 per gram; 10 kg or more, 28.10-29.99 per gram; intrinsic grade, under 10 kg, 31.95 per gram; 10 kg or more, 29.95 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $70-75 per troy oz nom.

Lead: Common, 11.80; chemical, 11.90; corroding, 11.90, St. Louis. New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 50 lb, $11 per lb, f.o.b. Minneapolis; 50-99 lb, $10; 100-499 lb, $9.50; 500 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex.; 1.3 in. diam. x 12 in. sticks, 57.00 f.o.b. Madison, Ill.

Magnesium Alloy: AZ91A (diecasting), 40.75; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $210-212 per 75 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-7.0 in. diam., 50-4999 lb, $8.15-11.50 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, in kegs, 74.50; "F" nickel, 5 lb ingots, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel, 69.60.

Osmium: $70-90 per troy oz nom.

Palladium: $24-26 per troy oz.

Platinum: $82-85 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $137-140 per troy oz.

Ruthenium: $45-50 per troy oz.

Selenium: $7 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; brick, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom.; sheet, $55 per lb nom.

Tellurium: $3.00 per lb.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 100.50.

Titanium: Sponge, 99.3+% grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 (0.5% Fe max.), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $2.75-2.90 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $3.50-4.25.

Zinc: Prime western, 13.00; brass special 13.25; intermediate, 13.00, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 14.25; special high grade, 14.50 deld. Diecasting alloy ingot No. 3, 16.50; No. 2, 17.00; No. 5, 16.75 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $8 per lb; 100-500 lb, $7 per lb; over 500 lb, $6.50 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 27.25-29.00; No. 12 foundry alloy (No. 2 grade), 25.00-25.25; 5% silicon alloy, 0.60 Cu max., 26.25; 13 alloy, 0.60 Cu max., 26.25; 195 alloy, 28.00-28.75; 108 alloy, 25.50-25.75. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 25.50; grade 2, 24.25; grade 3, 23.25; grade 4, 22.75.

Brass Ingot: Red brass, No. 115, 30.75; tin bronze, No. 225, 41.50; No. 245, 36.00; high-leaded tin bronze, No. 305, 35.25; No. 1 yellow, No. 405, 24.75; manganese bronze, No. 421, 29.25.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.25; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.975, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.955, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 38.35; l.c.l., 38.98. Weatherproof, 20,000-lb lots, 38.55; l.c.l., 39.30.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $17.50 per cwt; pipe, full coils, $17.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $7.25-17.00; sheared mill plate, $5.25-10.00; wire, $5.55-9.50; forging billets, $3.20-4.75; hot-rolled and forged bars, $4.00-6.25.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 28.00; ribbon zinc in coils, 22.50; plates, 21.50.

ZIRCONIUM

Plate, $12.50-19.20; H.R. strip, $12.50-22.90; C.R. strip, $15.90-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	138	120	138
Strip, C.R.	124	108	138
Plate, H.R.	130	110	126
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

(Selected products and sizes)

Flat Sheets: 1100, 3003, and 5005, mill finish, 30,000 lb base, f.o.b. customer custody.

Thickness Range (in.)	Widths (in.)	Length Range (in.)	Price Range
0.250-0.136	24-72	72-180	45.10-47.70
0.136-0.096	24-72	72-180	45.50-48.70
0.096-0.077	24-72	72-180	46.20-50.00
0.077-0.068	24-72	72-180	46.70-51.70
0.068-0.061	24-72	72-180	46.70-55.00
0.061-0.048	24-72	72-180	47.30-57.30
0.048-0.038	24-72	72-180	47.80-60.20
0.038-0.030	24-72	72-180	48.20-65.30
0.030-0.024	24-60	72-180	48.70-56.60
0.024-0.019	24-60	72-180	49.40-59.90
0.019-0.017	24-48	72-144	50.30-57.00
0.017-0.015	24-48	72-144	51.20-58.00
0.015-0.014	24-36	72-144	52.30
0.014-0.012	24-36	72-144	53.50
0.012-0.011	24-36	72-144	54.60
0.011-0.0095	24-36	72-144	56.20
0.0095-0.0085	24-36	72-96	57.50
0.0085-0.0075	24-36	72-96	59.20
0.0075-0.007	24-36	72-96	60.80
0.007-0.006	24-36	72-96	62.50

ALUMINUM (continued)

Plates and Circles: Thickness, 0.25-3 in.; width or diam., 24-60 in.; lengths, 72-240 in., mill finish.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	44.60	49.40
5050-F	45.70	50.50
3004-F	46.70	52.40
5052-F	47.30	53.10
6061-T6	47.80	53.90
2024-T4	51.80	58.90
7075-T6*	60.50	67.90

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 lb base, 12 ft lengths.

Diam. (in.)*	—Round— 2011-T3	2017-T4	—Hexagonal— 2011-T3	2017-T4
0.125	72.90	75.80	....	....
0.188	....	....	....	78.20
0.250	58.00	61.60	70.70	72.30
0.375	57.20	62.40	69.00	70.50
	2011-T3	2017-T451	2011-T3	2017-T451
0.500	57.20	62.40	69.00	70.50
0.625	57.20	62.40	65.80	66.60
0.750	55.70	60.70	59.60	62.60
0.875	55.70	60.70	59.60	62.60
1.000	55.70	60.70	59.60	62.60
1.125	53.30	58.30	57.50	60.40
1.250	53.30	58.30	57.50	60.40
1.375	53.30	58.30	57.50	60.40
1.500	53.30	58.30	57.50	60.40
1.625	51.00	55.60	....	58.20
1.750	51.00	55.60	56.30	58.20
1.875	51.00	55.60	....	58.20
2.000	51.00	55.60	56.30	58.20
2.250	49.50	54.00	....	58.20
2.500	49.50	54.00	....	58.20
2.750	47.90	52.20	....	58.20
3.000	47.90	52.20	....	58.20
3.250	....	52.20	....	....
3.375	....	52.20	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random lengths, diam., 0.375-8 in., "F" temper; 2014, 47.20-56.90; 6061, 43.20-56.90; 7075, 61.50-71.20; 7079, 66.50-76.20.

Pipe: ASA schedule 40, alloy 6063-T6, 3-40 ft. lengths, plain ends, 90,000 lb base, dollars per ft. Nominal pipe sizes: 1 in., 31.55; 1¼ in., 42.75; 1½ in., 51.05; 2 in., 61.70; 3 in., 123.40; 4 in., 169.55; 5 in., 229.60; 6 in., 304.60; 8 in., 458.40; 10 in., 706.45 (3-24 ft. lengths).

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
1-14	44.70-46.20	53.20-59.00
15-17	44.70-46.20	55.60-60.80
18-23	45.20-46.80	57.70-66.40
24-32	45.20-46.80	65.60-78.80
33-38	48.80-51.40	82.30-93.40
39-44	58.70-62.40	99.90-121.00

MAGNESIUM

Sheets and Plate: AZ31B standard grade, .032 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.10; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	65.30-67.60	84.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-68.40	90.60-91.30
36-38	71.50-75.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 25.75-26.25; No. 2 heavy copper and wire, 22.75-23.25; light copper, 21.25-21.75; No. 1 composition red brass, 18.50-18.75; No. 1 com-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES e (Based on copper at 33.00c)		
	Sheets, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	57.13b	54.86c	....	58.32	29.000	29.000	28.250
Yellow Brass	50.57	36.06d	50.86	54.23	22.250	21.250	20.250
Low Brass, 80%	53.53	53.22	53.82	57.09	24.750	24.500	24.000
Red Brass, 85%	54.58	54.27	54.87	58.14	25.750	25.500	25.000
Com. Bronze, 90%	56.17	55.86	56.46	59.48	26.750	26.500	26.000
Manganese Bronze	58.86	52.21	62.69	....	20.875	20.625	19.875
Muntz Metal	53.20	48.26	....	....	20.875	20.625	20.125
Naval Brass	55.12	48.68	61.43	58.78	20.750	20.500	20.000
Silicon Bronze	62.86	61.80	62.15	80.79	28.375	28.125	27.375
Nickel Silver, 10%	65.98	68.06	68.06	....	26.875	26.625	14.937
Phos. Bronze	77.44	78.19	77.69	79.37	29.875	29.625	28.625

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb.

position turnings, 17.25-17.75; new brass clippings, 16.00-16.50; light brass, 12.25-12.50; heavy yellow brass, 13.25-13.75; new brass rod ends, 14.00-14.50; auto radiators, unsweated, 14.50-15.00; cocks and faucets, 15.50-16.00; brass pipe, 15.75-16.20.

Lead: Soft scrap lead, 8.00-8.25; battery plates, 3.00-3.25; linotype and stereotype, 9.00-9.50; electrotype, 7.25-7.75; mixed babbitt, 9.50-10.00.

Monel: Clippings, 28.00-29.00; old sheets, 24.00-26.00; turnings, 20.00-22.00; rods, 28.00-29.00.

Nickel: Sheets and clips, 52.00-54.00; rolled anodes, 52.00-54.00; turnings, 39.00-40.00; rod ends, 52.00-54.00.

Zinc: Old zinc, 4.50-4.75; new diecast scrap, 4.00-4.25; old diecast scrap, 2.50-2.75.

Aluminum: Old castings and sheets, 11.00-11.50; clean borings and turnings, 7.00-7.50; segregated low copper clips, 15.00-15.50; segregated high copper clips, 14.00-14.50; mixed low copper clips 14.50-15.00; mixed high copper clips, 12.50-13.00.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 12.75-13.25; clean borings and turnings, 10.00-10.50; segregated low copper clips, 16.75-17.25; segregated high copper clips, 16.00-16.50; mixed low copper clips, 16.00-16.50; mixed high copper clips, 15.50-16.00.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 11.50-11.75; clean borings and turnings, 10.50-11.00; segregated low copper clips, 15.75-16.25; segregated high copper clips, 14.75-15.25; mixed low copper clips, 15.25-15.75; mixed high copper clips, 14.25-14.75.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 59.00; light scrap, 54.00; turnings and borings, 39.00.

Copper and Brass: No. 1 heavy copper and wire, 27.50; No. 2 heavy copper and wire, 25.75; light copper, 23.50; refinery brass (80% copper) dry copper content, 24.75.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 27.50; No. 2 heavy copper and wire, 25.75; light copper, 23.50; No. 1 composition borings, 22.00; No. 1 composition solids, 22.50; heavy yellow brass solids, 16.50; yellow brass turnings, 15.50; radiators, 18.00.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.50.

Copper: Flat-rolled, 50.04; oval, 48.00; 5000-10,000 lb; electrodeposited, 42.50; 2000-5000 lb lots; cast, 45.00, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 118.50; 200-499 lb, 117.00; 500-999 lb, 116.50; 1000 lb or more, 116.00.

Zinc: Balls, 20.50; flat tops, 20.50; flats, 23.25; ovals, 22.50, ton lots.

CHEMICALS

Cadmium Oxide: $1.40 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,900 lb, 61.90.

Copper Sulphate: 100-1900 lb, 16.00; 2000-5900 lb, 14.00; 6000-11,900 lb, 13.75; 12,000-22,900 lb, 13.50; 23,000 lb or more, 13.00.

Nickel Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 5000-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,900 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 200 lb, 23.80; 400-800 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 78.50; 100-600 lb, 69.20; 700-1900 lb, 66.40; 2000-9900 lb, 64.60; 10,000 lb or more, 63.30.

Stannous Chloride (Anhydrous): 25 lb, 153.80; 100 lb, 148.90; 400 lb, 146.50; 800-19,900 lb, 105.60; 20,000 lb or more, 99.50.

Stannous Sulphate: Less than 50 lb, 139.00; 50 lb, 109.00; 100-1900 lb, 107.00; 2000 lb or more, 105.00.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(Concluded from Page 127)

$37, a decline of $1 from the last sale. The mill also bought secondary grades, including No. 2 heavy melting at $34 and No. 2 bundles at $28, both unchanged from recent levels.

• **Cincinnati** — Steelmaking scrap prices advanced 50 cents to $1 a ton last week when a district mill entered the market for substantial tonnage. No difficulty is anticipated in filling the mill's requirements.

• **St. Louis**—The market continues dull. Local mills are willing to buy at existing price levels, but dealers haven't much to sell. Material is coming in from collectors slowly, partly because of bad weather. The railroads are offering little tonnage.

• **Birmingham** — With one large electric furnace operator returning to the market (Feb. 1) paying $1 per ton more for material, brokers and dealers are predicting increased buying of the foundry grades of scrap. Most anticipate higher prices.

• **Los Angeles**—The price on No. 1 heavy melting steel is unchanged at $40, but market sentiment is bearish.

• **Portland, Oreg.**—The market is off $1 to $2 a ton. March quotations: No. 1 heavy melting $37, No. 2 heavy melting $34, No. 1 bundles $34, and No. 2 bundles $23. The leading buyer is not active, and sales are down.

Schnitzer Steel Products Co. is assembling a full cargo for export to Japan, March shipment.

• **Seattle** — Prices are considered nominal in the absence of active demand. The leading consumer is not taking in prepared material, and export interest is limited.

• **San Francisco**—No. 1 cupola cast scrap is quoted off $2 a ton here. Prices on the steel grades are unchanged, but some market observers think No. 1 and No. 2 heavy melting may be cut a couple dollars a ton despite strength stemming from export demand.

Consumers' Scrap Stocks Increased During Strike

Consumers' stocks of scrap at the end of October, 1959, totaled 8,790,755 gross tons, while stocks of pig iron were 3,003,601 tons, reports the U. S. Bureau of Mines. (Its first monthly report on iron and steel scrap since last July because of the steel strike.) Scrap stocks at the end of September were 8,610,706 tons, and pig iron stocks were 3,057,662 tons.

Consumption of scrap totaled 2,266,709 tons during October compared with 2,114,015 tons in September, 1,875,165 in August, and 3,584,931 in July. Pig iron consumption in October was 1,046,053 tons vs. 971,040 in September, 895,659 in August, and 3,193,458 in July.

Structural Shapes . . .

Structural Shape Prices, Page 116

Structural fabricating shops are back to normal operations with mill shipments of plain material coming in steadily. Headway is being made on delayed work. Progress is less noticeable where wide flange

CLASSIFIED

BERRY BEARING COMPANY
Bearing Headquarters Since 1920
Phone: DAnube 6-6800
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Representatives Wanted

SALES REPRESENTATIVE—Long established producer of metal abrasives requires Manufacturers agent for Ontario, Canada area. Also representation for Philadelphia-New Jersey area. Prefer individuals now contacting foundries, forge, steel & heat treating plants. Address: Reply to Box 825, STEEL, Penton Bldg., Cleveland 13, Ohio. State experience and present activity. Personal interview will be arranged.

Positions Wanted

MECHANICAL ENGINEER, 45, graduate, 20 years tube mill plant and project engineering; including design, specifications, forward planning, and new construction. Desires responsibilities at departmental or corresponding administrative level. Reply Box 822, STEEL, Penton Bldg., Cleveland 13, Ohio.

WE CAN HELP YOU TO CONTACT high calibre men to fill specific jobs you have in mind—

Readers of STEEL include men of wide training and experience in the various branches of the metalworking industry. When you have an opportunity to offer, use the Help Wanted columns of STEEL.

RANSBURG

What Would Paint Savings Like This* Mean in YOUR Finishing Department?

Quality is all important in the production of fine Metalcraft furniture by George Koch Sons, Inc., Evansville, Indiana.

That's why they use the Ransburg Electrostatic Hand Gun to apply a uniform clear coating on their brass-plated furniture. The protective coating is baked on. Although the bulk of their present production is in the popular brass line, they still paint the metal furniture in a variety of colors with the Hand Gun.

Painting is CLEANER ... QUICKER ... CHEAPER *with the Ransburg Electrostatic Hand Gun.*

These chairs and table are typical of the Koch line of metal furniture.

*10 GALLONS OF PAINT NOW DOES THE JOB WHICH FORMERLY TOOK 30 GALLONS

On one item—a TV table—they formerly used 30 gallons of enamel to coat 1000 units by combination dip and air spray method. Now—with the Ransburg Electrostatic Hand Gun, they paint 1000 tables with only 10 gallons. And, they get a better, more uniform coating, too.

NO REASON WHY YOU CAN'T DO IT, TOO!

See how the Electrostatic Hand Gun can save time . . . paint . . . and cut costs in YOUR finishing department. Or, if your production justifies, it'll pay you to investigate Ransburg's automatic electrostatic spray painting equipment. Write for our No. 2 Process brochures which show numerous examples of modern production painting in both large and small plants.

RANSBURG

RANSBURG
Electro-Coating Corp.
Box-23122, Indianapolis 23, Indiana

sections are needed, but even in this area there is improvement.

New orders for wide flange sections can be placed for delivery in late March and early April. Standard shapes are available for early March shipment.

Prices on fabricated structurals in New England are subject to stiff competition, but they are firming up slightly. More bids at 15 cents a pound, or higher, fabricated and erected, are coming out, though estimates under that level haven't disappeared.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

4800 tons, 110 in. plate mill, Alan Wood Steel Co., Conshohocken, Pa., to Bethlehem Fabricators, Bethlehem, Pa.; United Engineers & Constructors, Philadelphia, in charge.

4000 tons or more, main sections, John Day Dam, to Consolidated Western Corp., Seattle; C. J. Montag & Sons and associates, Portland, Oreg., general contractor.

3600 tons, mill, American Smelting & Refining Co., Sahurita, Ariz., to Campbell Steel Co., San Antonio, Tex.

2500 tons, two story office building, Third Ave. and 46th St., New York, through Diesel Construction Co., general contractor, to Dreier Structural Steel Co. Inc., Long Island City, N. Y.

2115 tons, crib structure for Titan missiles, for erection at various points by American Machine & Foundry Co., New York, to Bethlehem Steel Co., Bethlehem, Pa.

1890 tons, shopping center, Millburn, N. J., through John W. Ryan, New York, general contractor, to Bethlehem Fabricators, Bethlehem, Pa.

890 tons, apartment, Carol Management Corp., E. 86th St., New York, to Simon Holland & Son Inc., Brooklyn, N. Y.

795 tons, state bridgework, Nassau County, New York, through Rappone Construction Co., general contractor, to American Bridge Div., U. S. Steel Corp., Pittsburgh.

STRUCTURAL STEEL PENDING

95,000 tons (approximately) Narrows Bridge, Brooklyn and Staten Island, N. Y., Triborough Bridge & Tunnel Authority, New York; bids opening Feb. 16 on 41,000 tons for the stringers and cables, and on Feb. 24 on 53,000 tons for the towers.

12,700 tons, state bridgework, Kings County, New York; bids closed Feb. 4.

5000 tons, bus garage at George Washington Bridge, Port of New York Authority, New York; bids Feb. 16, but there may be a postponement.

2000 tons, section, Jones Falls Expressway, Baltimore, for Maryland State Road Commission; C. J. Langenfelder & Sons, Baltimore, low on the general contract.

1428 tons, state bridgework, New York County, New York; bids closed Feb. 4.

1000 tons or more, five track bridge, Kalamazoo River, Battle Creek, Mich.; bids Mar. 17, Grand Trunk Western Railroad, Detroit.

970 tons, George Westinghouse High School, Brooklyn, N. Y.; Cristo Construction Co., Brooklyn, low on the general contract.

660 tons, Anacostia Freeway, Washington; bids closed Feb. 5.

600 tons, phase 5, approach work, George Washington Bridge, New York; George M. Brewster, Bogota, N. J., low on the general contract.

465 tons, subway platform work, New York City Transit Authority, New York; Peerless Construction Co. and A. I. Waldman, low, jointly on the general contract.

456 tons, phase 6, approach work, George Washington Bridge, New York; Johnson, Drake & Piper, New York, low on the general contract.

Advertising Index

Ajax Magnethermic Corporation 76
Allegheny Ludlum Steel Corporation 85
Allied Oil Co. Division of Ashland Oil & Refining Co. 57
Aluminium Limited Sales, Inc. 52
American Steel & Wire Division, United States Steel Corporation 101, 102
Ashland Oil & Refining Co., Allied Oil Co. Division 57

Berry Bearing Co. 133
Bethlehem Steel Co. 1
Borg-Warner Corporation, Ingersoll Kalamazoo Division 126
Bridgeport Rolling Mills Co. 64
Brighton Screw & Manufacturing Co. 16
Buffalo Forge Co. 37

Carpenter Steel Co., The 97
Century Electric Co. 99
Chambersburg Engineering Co. 113
Chicago Steel Service Co. 131
Cincinnati Milling Machine Co., The 51
Colorado Fuel & Iron Corporation, The 29
Columbia-Geneva Steel Division, United States Steel Corporation 8, 9, 101, 102
Columbia Tool Steel Co. 126
Cooper-Bessemer 22, 23
Copperweld Steel Co., Aristoloy Steel Division 61

Eaton Manufacturing Co., Forval Division .. 42
Erie Forge & Steel Corporation 89
Euclid Crane & Hoist Co., The 126

Forval Division, Eaton Manufacturing Co. 42
Fenn Manufacturing Co. 73
Foster, L. B., Co. 94

Gates Rubber Co., The 87
General Steel Castings 12
Georgia Department of Commerce 11
Goslin-Birmingham Manufacturing Co., Inc. 111

Harrington & King Perforating Co., Inc., The 10
Heald Machine Co., The .....Inside Front Cover
Heppenstall Co. 66
Houghton, E. F., & Co. 24, 25

Ingersoll Kalamazoo Division, Borg-Warner Corporation 126
International Basic Economy Corporation, Valvair Division 7

Jones & Laughlin Steel Corporation, Stainless & Strip Division 106

Kirk & Blum Manufacturing Co., The 104

Lamson & Sessions 2
LeBlond, R. K., Machine Tool Co., The 38
Link-Belt Co. 3
Luria Brothers & Co., Inc. 129

McGill Manufacturing Co., Inc., Bearing Division 30

Mahon, R. C., Co., The 13
Midvale-Heppenstall Co. 66
Miller, Alan C., & Co., Inc. 127
Minneapolis-Honeywell 40, 41

National Tube Division, United States Steel Corporation 8, 9
New Jersey Zinc Co., The 58
Northern Engineering Works 69
Norton Co., Machine Tool Division 26, 27

Pittsburgh Crushed Steel Co. 127

Ransburg Electro-Coating Corporation 134
Reliance Electric & Engineering Co. 21
Republic Steel Corporation 14, 15
Roebling's, John A., Sons Division, The Colorado Fuel & Iron Corporation 29
Russell, Burdsall & Ward Bolt & Nut Co. .. 62
Ryerson, Joseph T., & Son, Inc. 32

Sandvik Steel, Inc. 91
Screw & Bolt Corporation of America 65
Simonds Abrasive Co. 28
Square D Co. 105
Standard Tube Co., The 108
Stuart, D. A., Oil Co., Ltd. 119, 120

Tennessee Coal & Iron Division, United States Steel Corporation 101, 102
Threadwell Tap & Die Co. .... Inside Back Cover
Timken Roller Bearing Co., The .....Back Cover

United States Rubber Co., Mechanical Goods Division 74, 75
United States Steel Corporation, Subsidiaries 8, 9, 101, 102
United States Steel Export Co. 8, 9, 101, 102

Valvair Division of International Basic Economy Corporation 7

Wapakoneta Machine Co., The 112
Washburn Wire Co. 4
Wean Engineering Co., Inc., The 31
Wisconsin Motor Corporation 110

Yoder Co., The 6
Youngstown Sheet & Tube Co., The 17, 18, 19, 20

~ ~ ~

Table of Contents
Facing Inside Front Cover

Classified Advertising, Page 133

TO FIND THE MAN YOU NEED . . .

Place an advertisement in the "Help Wanted" columns of STEEL's classified pages. Your advertisement will reach the qualified men you need, because STEEL is addressed to highly-trained men in all phases of metalworking

STEEL
The Metalworking Weekly

"Sure it's a great idea but we were only using 26% of it!"

"We've had the Payroll Savings Plan for U.S. Savings Bonds in our outfit for years. We think it is good for the Country and good for our company—and it goes without saying it's good for the saver. I had assumed we had a large participation by our people. But when I checked up last month I found that only 26% of our employees were regular users of the plan. In a company our size there is always a certain amount of personnel turnover, and there are always some people who are going to subscribe . . . next payday, maybe.

"So what I did was contact our State Savings Bonds Director. He helped us put on a company-wide campaign that reached every employee personally to point out the advantages of buying new 3¾% Savings Bonds, *regularly*. Today we have more than 50% of our people using the plan, and we're going on from there!"

Perhaps *your* organization, too, has been taking your Payroll Savings Plan for granted. It's a great idea, but its value to your people and to your company increases with the number of employees who use it, *every payday*. Let your State Savings Bonds Director show you how easy it is to get your company back in the high value area of participation. Or write Savings Bonds Division, U.S. Treasury Department, Washington, D.C.

ALL U.S. SAVINGS BONDS—OLD OR NEW—EARN ½% MORE THAN BEFORE

STEEL
The Metalworking Weekly

THE U. S. GOVERNMENT DOES NOT PAY FOR THIS ADVERTISEMENT. THE TREASURY DEPARTMENT THANKS, FOR THEIR PATRIOTISM, THE ADVERTISING COUNCIL AND THE DONOR ABOVE.

PROBLEM

How to get used to rush jobs again

Threadwell

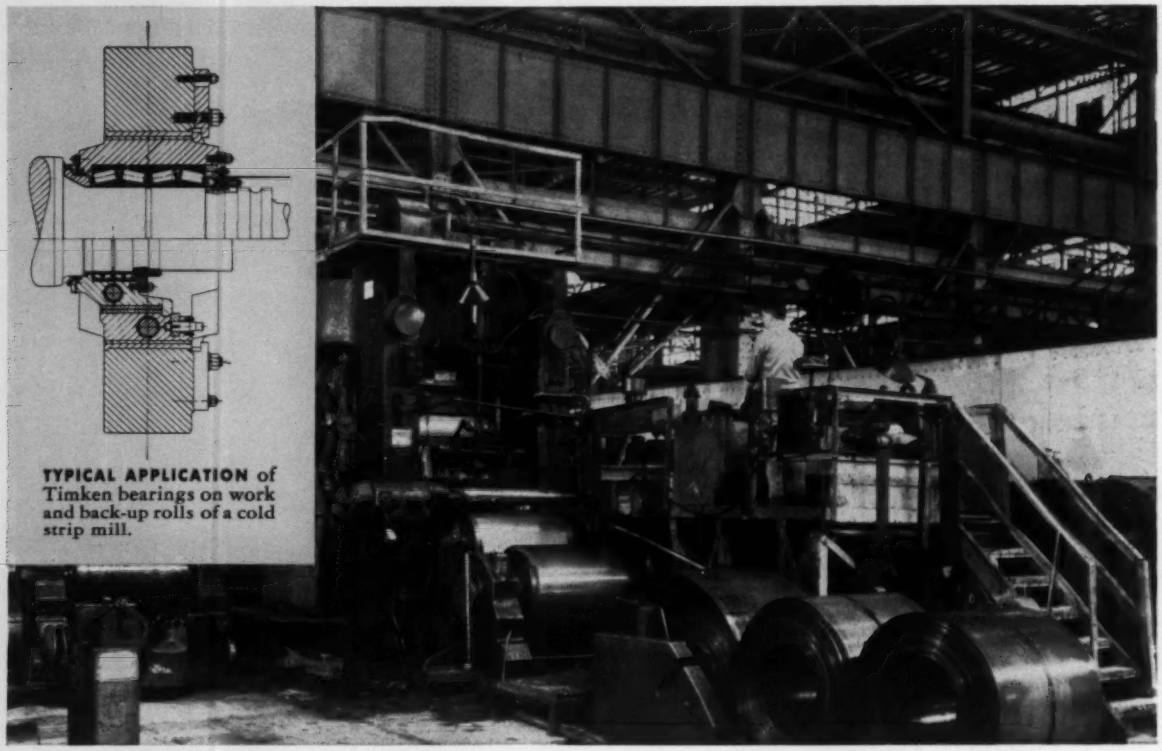
MAKES THE BEST PRODUCT BETTER

INDUSTRIAL DISTRIBUTORS THE RIGHT HAND OF PRODUCTION

One good way to stay on top of the job is to standardize on Threadwell cutting tools and gages which relieve the worry about down time and rejects. Uninterrupted production and precision machining are Threadwell specialties. Convenient warehouses and a network of national Distributors take care of fast delivery, too. . . . and your Threadwell Field men and Distributors are glad to rush to give you a hand in production planning.

THREADWELL TAP & DIE CO.
GREENFIELD, MASSACHUSETTS

Stocking Warehouses: New York — Cleveland Detroit — Los Angeles — Greenfield, Mass.



TYPICAL APPLICATION of Timken bearings on work and back-up rolls of a cold strip mill.

Inland Steel boosts bearing load capacity 50% —just by switching to Timken® bearings

BY switching to Timken® bearings on the roll necks, Inland Steel obtained a 50% gain in load capacity with no increase in power demand on the 4-high cold reversing mill above. Longer bearing life resulted, too. What's more they gained these advantages without sacrifice of compact design. With previous bearing designs, momentary overloads caused premature failures. And low permissible screw down pressures limited rolling practice.

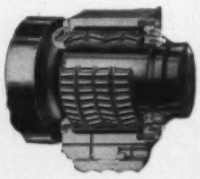
Timken roll neck bearings are used in over 1,000 mill installations around the world to assure minimum cost per ton of steel rolled. That's because: 1) *They roll the load*—virtually eliminate friction. Timken bearings have tapered design to take both radial and thrust loads. 2) *They are precision manufactured*—assuring close control of product gauge. 3) *They minimize maintenance;* Modern Timken roll neck bearings are designed to provide the best combination of bearing capacity, rigidity and roll neck strength for a given mill roll diameter. Bearings and roll necks stand up longer under load. Grease or oil mist lubrication provides further economies. And, 4) *They give longer bearing life.* Mill records show that service life of Timken back-up roll bearings has been obtained in excess of 12,000,000 tons of steel rolled. The full-line contact between rollers and races gives them extra load-carrying capacity.

When you buy or build a mill, make certain you buy the best in bearing performance and engineering service—specify Timken bearings. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO". *Makers of Tapered Roller Bearings, Fine Alloy Steels and Removable Rock Bits.*

BETTER-NESS rolls on

TIMKEN®

tapered roller bearings



First in bearings for 60 years

WHEN YOU BUY TIMKEN® BEARINGS YOU GET...

1. Quality you can take for granted
2. Service you can't get anywhere else
3. The best-known name in bearings
4. Pace setter in lower bearing costs